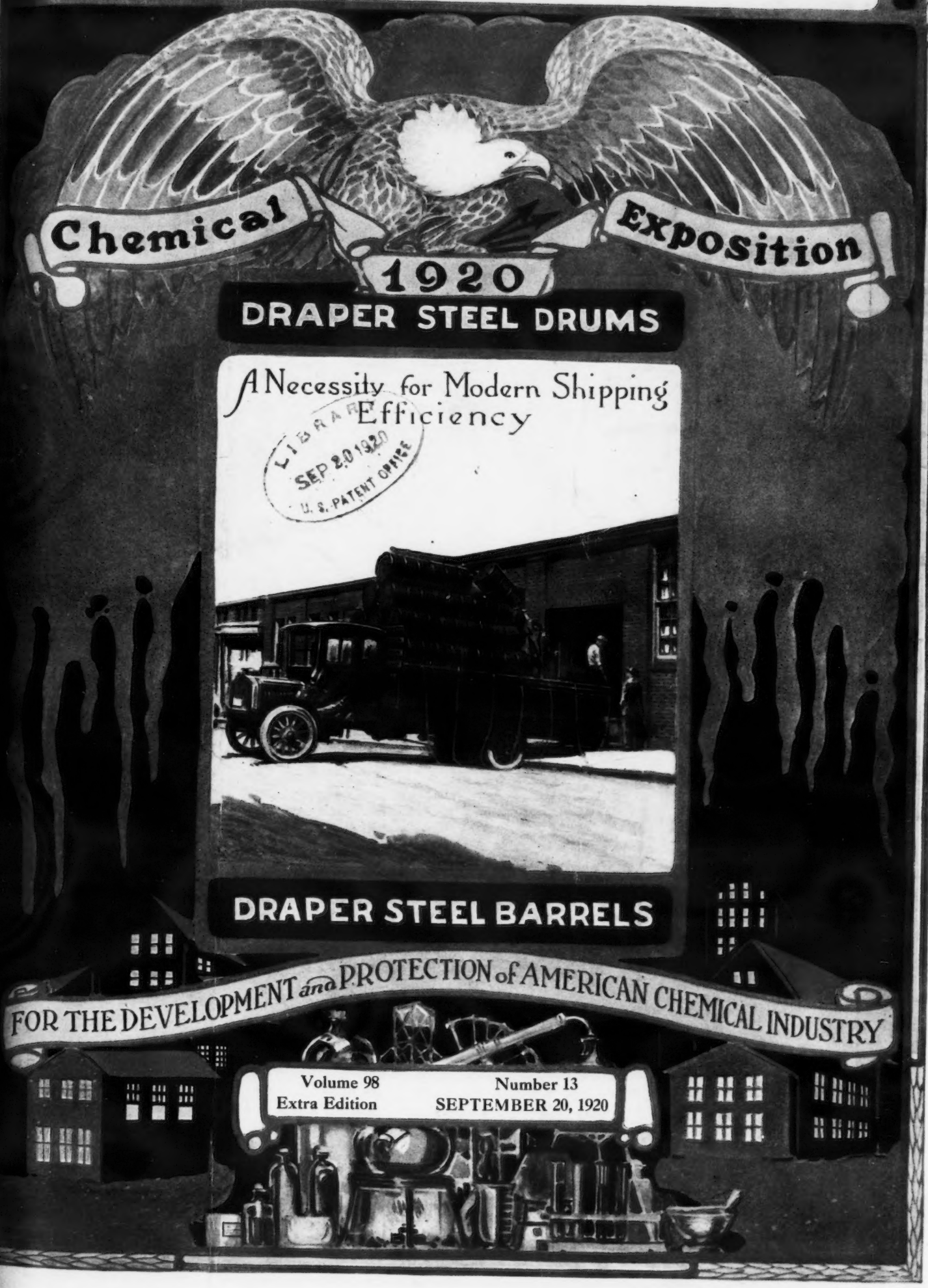
Div-31

Oil Paint and Drug Reporter

-100 William Street - New York -



Volume 98 Number 13
Extra Edition SEPTEMBER 20, 1920

DRAPER

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DMC

CHEMICAL EXPOSITION—EXTRA EDITION

Oil, Paint and Drug Reporter

Volume 98. No. 13 MONDAY, SEPTEMBER 20, 1920 100 William St., New York

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Chemistry's Case in America

—By Chas. F. Roth

LAST year, Mr. Editor, you entitled the piece which I contributed for your Chemical Exposition Number "America's Case in Chemistry" because in the Exposition then the program contained a symposium of papers wherein chemists "made their case" for America and showed that she had been productive in the field of chemistry and developed those industries in this country to supply the needs of the people. The case was plain and the chemist, attorney for the basic industries, rested it with the jury—the people of the nation—in the hope that the verdict rendered would be one to give courage to these infant and necessary industries.

But the jury—the Congress serving the people—disagreed and adjourned without arriving at a decision. They defected from their obligation and left the chemical and related industries in a helpless state of suspension. With hesitation and apprehension for the future, can one expect that the chemical industries should go forward on a fruitless effort to place the nation in an impregnable position? It would seem that this year a revision of this title should spell "Chemistry's Case in America," for such is what the Chemical Exposition will once more do, this year, perhaps, more thoroughly than in the past.

This year the American Dyes Institute has organized a genuine campaign of education to place before the people the facts and the truth about the superiority of American dyes. They will also show how the industry represented furnishes the pigmentation for the life blood of a series of industries, the products of which, enhanced in value by these days, contribute so greatly to the nation's treasury through the taxation bureau. Not only is this a source of wealth to the Government, but these industries are essential to the comfort and well-being of the people.

Another piece of evidence in Chemistry's Case will be furnished by the Government itself through the War Department for its most important arm—and a new appendage, too—the Chemical Warfare Service will aim to show the intimate relation between it and every branch of chemistry as represented by industry. In doing this it will of necessity show the dependent connection between the manufacture of dyes, chemicals and other industries which furnish war materials. More than this, it will chiefly develop the absolute dependency of the nation upon the basic chemical industries for the national defense. The war is too recently passed for the people of the nation to have forgotten the almost helpless state in which the nation found itself when it entered the war, and the memory should be sufficiently pliable to recall that the chemical industries, because of their better preparedness, were those which saved the situation.

Numerous other evidences in Chemistry's Case will be introduced. The entire Exposition will further the case in America. But the Exposition is not designed for only this purpose, nor do the chemical industries intend to complacently rest on their war-won laurels. They have a bigger purpose and a forward one—one to carry the entire industrial fabric of the country to a higher development. Still the Industrial University, the Exposition, takes the lead, now in other directions. It essays to show the need for fuel economy both through a series of addresses forming a symposium on Fuel Economy, and in a section of exhibits having this in mind.

Another endeavor is to show how the cost of living in nearly all phases is maintained at the present high level through a defect in the methods of handling our daily articles of food and use in the manufacturing plant in transportation and in the terminal station. The symposium on Materials Handling will prove that part of the initial expense comes through the use of costly methods of handling the raw materials in the factory and later at the shipping or terminal point.

Yes! and it will demonstrate that this cost increasing defect which is permitted is in a large measure responsible for the embargoes which have caused so great inconvenience, shortage in supplies and consequent considerable increase in cost. There will be exhibits of material handling machinery which will impress the thoughts conveyed in the addresses on the program. Near and closely related to the handling of material is the problem of shipping containers or packages, for all material must be contained within some body depending upon the nature and the use as well as the quantity size in which it is to be distributed to the consumer.

Even in this the Exposition offers help to the manufacturer, for there will be exhibits in illustration of these. Still in its onward stride the Electric Furnace Section, so well begun at the last Exposition, moves forward with cumulative strength, and metallurgists, electro-metallurgists, electro-chemists as well as steel manufacturers and heat treaters will find much of real and helpful information to be gathered from a survey. The Fuel Economy Section brings much in the way of furnaces, heating equipment, gas producers and furnace material which will be of interest to metallurgists, steel and metal heat treaters, as well as all other industrialists.

During the period of the war an organization of four-minute men sounded the clarion of defense in the home centers of the country, conducting an indefatigable campaign for awakening the people to the utter necessity for conducting the war to a successful conclusion. The Germans believe that their organized scientific literature so broadly distributed previous to the war was the direct means of losing the war for them, since it showed the way to their enemies. It comes to us that a movement was begun in Germany to prevent any more German scientific literature leaving the country.

This brings forward as a means of defense for industry and the nation for the preparation of Tables of Physical and Chemical Constants, and in the preparation of these the co-operation of every scientist, whether in research or industrial work, is required, as well as of the business man and manufacturer who will reap the direct pecuniary benefits from the compilation of this tremendously laborious work, is needed. The importance of the industries and the national welfare of the publication of this compendia undertaken by the National Research Council is such that the clarion of another group of four-minute men will be sounded on each program during the Exposition to awaken the industries to the urgency of the need for these tables.

There are upon the program in the meetings of the American Institute of Chemical Engineers on Thursday and the American Ceramic Society on Friday papers and addresses on things new in the technical and industrial fields. In motion pictures, too, the program is replete with live interest; these are divided into a group showing Great American Chemical Industries, another Mining Industries, while still a third develops various plant and management displays. So new are some of these pictures that at the time this goes to press some of the films will still be wet from the developing baths.

The Exposition this year more than fills the fondest hopes of the management in that it fulfills the statement that this is the "Greatest Industrial Exposition" ever held and it is the "market place" for the world. It this year numbers exhibitors nearly to the five hundred mark, and is, so far as records prove, the premier world's Industrial Exposition. More than this, it is like a mirror held up to the nation, for as an index, may be seen therein the remarkable industrial development it has contributed to bring about in this half of the western hemisphere.

—SCOTT—

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Impregnating Equipment

Plant for Wood Distillation and all By-Products

Complete Plants for handling Animal Waste, Tallow, Blood, Etc.
Complete Chemical Process Machinery
Complete Equipment for Recovering from Factory Wastes viz.
Pulp, Paper, Packing House, Soap Works, Etc.

ERNEST SCOTT & CO.

FALL RIVER, MASS.

CHEMICAL EXPOSITION

Oil, Paint and Drug Reporter

EXTRA EDITION

Volume 98. No. 13 MONDAY, SEPTEMBER 20, 1920 100 William St., New York

OIL, PAINT and DRUG REPORTER
ESTABLISHED 1871.

The following publications are incorporated in the REPORTER:—

DRUG, PAINT AND OIL TRADE
NEW YORK DRUG BULLETIN
NEW YORK DRUGGIST'S PRICE CURRENT
SOAP MAKERS' JOURNAL OIL AND PAINT REVIEW
WEEKLY DRUG NEWS

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ADVERTISING RATES will be furnished upon application.

QUESTIONABLE OR UNDESIRABLE ADVERTISEMENTS WILL NOT BE ACCEPTED.

Value of Chemistry to Nation

If there is any industry or calling that in one of its various stages does not enlist the services of the chemist, then that fact is being kept secret from mankind. Time was when the chemist was restricted in his operations. He confined his studies and research to a rather limited field. His true relationship to industry and commerce at that time had not been properly evaluated. Today the chemist has come to occupy a position which for years he has striven to attain. Having reached what he thought was the goal, the chemist now finds that other vast fields lie exposed before him. His potential usefulness is infinite. There is no end to what he will be required to do.

It is this practical scientific value of the chemist to industry, as contrasted with the theoretical, which makes the Sixth National Exposition of the Chemical Industries of such moment and value to the nation. It is in the less popular, but by no means less important, discoveries that the chemist up to now has registered most of his labors. What he has accomplished in coal-tar chemicals and dyes is more or less a matter of common knowledge. But how many know of the really astounding latter day miracles that have been performed by the chemist in less known fields?

Whether it is in the discovery of a disinfectant for the extermination of plant, vegetable or animal diseases; or in the recovery of old books and magazines for the purpose of supplying print paper to overcome the existing shortage; or in the production of sugar and alcohol from various vegetable substances; or in the extraction of valuable products from what were formerly considered waste materials of industry—in all these and more has the chemist played his part.

If the chemist has been active in playing his part in the ever changing conditions of industry (in many instances, in fact, he has pointed the way), the manufacturer of laboratory apparatus and equipment himself has not been a bit backward in the development of his products to meet the needs of the chemist, whether it be in the laboratory or in the factory. Before laboratory results can be translated into processes for production on a large commercial scale, the invention and manufacture of special purpose machinery ofttimes becomes necessary. Both the chemist and the manufacturer have labored in conjunction. Without this co-operation the chemical industries could not have achieved half the success they have achieved during the past five years.

At the exposition is summed up for the beholder all the new inventions and discoveries that have been developed commercially since last year's exposition. The exhibits clearly show that the chemical industries are moving onward steadily. The impetus they have received as a result of the demands made upon them during the war, instead of dying away, has, if anything, undergone acceleration.

The chemist is the modern miracle man. The products conjured up by his magic utensils can be seen in profusion at the Grand Central Palace all of this week. Every American who is interested in the development of his country—and every real American is—should find occasion to visit the Chemical Exposition on at least one of the days it will be open. Then he should ask himself in all seriousness if the industries he finds represented there should be exposed to the merciless competition of foreign industries.

Reporter's Exposition Number

In addition to this pre-exposition number, with its complete program of all the sessions, official lists of exhibitors, alphabetically arranged for ready reference, and diagrams of all the exhibition floors with booth arrangements, the Oil, Paint and Drug Reporter will present a complete and detailed illustrated report of the exposition sessions.

This report will be presented with the regular issue of Monday, September 27, as a regular part of Reporter Service, without extra charge to subscribers, in the form of an Exposition number. This number will be a complete record of the activities of the exposition, with photographs of the officers of the participating associations, views of the exposition halls and descriptions of the booths. In fact, it will be an adequate souvenir report of the Sixth National Exposition of Chemical Industries, with a special cover in four colors and a widely representative list of advertising. Many regular advertisers, as in former years, have taken additional and separate space in the Reporter's two Chemical Exposition Numbers, while other firms of national scope have taken advantage of the wide publicity to be gained through the distribution of these two special editions.

The present number, which is an extra issue of the Reporter for September 20, 1920, will be distributed to every booth and exhibitor at the Grand Central Palace today. The Exposition Number proper, as already indicated, will be mailed to subscribers with the regular issue of the Reporter for September 27.

Visitors to the exposition are cordially invited to avail themselves of the facilities afforded by the Oil, Paint and Drug Reporter at its booth, No. 286, Mezzanine. The Reporter representatives in attendance at the booth will be glad at all times to give all possible information as to the Reporter and its allied publications, The Painters Magazine and The Druggists Circular.

Hail the Sixth Chemical Exposition!

The progress made in laboratory research in the dye and chemical industries of the United States and the development of new chemical products during 1919 are registered in concrete, physical form at the Sixth National Exposition of the Chemical Industries, which begins today at the Grand Central Palace, this city, and comes to a close Saturday, September 25. In a multitude of products ranging from the most delicate instruments of precision to new chemicals and dyes not formerly made in this country is afforded a tangible, visible indication of how far the chemical industries of the United States have gone since the outbreak of the world war.

At the exposition, under one roof, will be found a vast amount of machinery and other products brought together from every part of the United States to bear testimony to the fact that the chemical industries of this country have arrived at a new stage in their development. The roster of exhibitors who are displaying their achievements this-year far outnumbers that of any preceding year. Here will be found experts who are only too eager to impart information to the seeker after chemical knowledge. One, indeed, can obtain a liberal education on the technical and non-technical phases of the chemical industries if he but avail himself of the services of the representatives at the various booths.

This year the exposition has arranged for two new sections—a fuel economy section and a materials handling section. The need for enlightenment on the subjects with which these sections will concern themselves is apparent; the constantly mounting cost and the increasing scarcity of all kinds of fuel lend importance to the symposium on the former, while the need for mechanical devices to take the place of or make up for the deficiency in man power at the present time lends value to the latter.

In addition to the booth exhibits and the subjects mentioned in the foregoing, symposia have been prepared by the exposition management on industrial management, chemical engineering and ceramics. Motion pictures illustrate a wide range of chemical operations.

As a medium for education an exposition such as the one now being held at the Grand Central Palace cannot be surpassed. Through the many lectures, exhibits and motion pictures the public can be brought to a realization of the enormity and magnitude of the chemical industries and their importance to the welfare of the country in a degree that can be approximated by no other single medium. "Seeing is believing."

The chemical industries have come slowly through the period of reconstruction. All the vestiges of war have by this time been eradicated from the chemical plants. The exposition now presents the peace side of the country's most important industries toward the public for its approval. Hail the Sixth National Exposition of Chemical Industries!

THIS IS AN EXTRA EDITION

This issue of the Reporter is an extra edition devoted exclusively to the programs and exhibitors' lists of the Sixth National Exposition of the Chemical Industries, which opens today at the Grand Central Palace, New York city, and will continue throughout the week. It is published as an extra edition as a matter of greater convenience to our subscribers, and in order that the issuance of the regular publication of the Reporter may not be delayed. This extra edition is so arranged that it is complete in itself and can be used readily as a guide to the exposition, since it contains all the official programs, together with descriptions of booths, lists of those exhibiting, diagrams of the exhibition halls, etc. A copy of this extra edition is being mailed to all of our subscribers as a part of their yearly subscription, without extra charge.

Don't Miss the Movies!

Having demonstrated beyond the shadow of a doubt that the visual presentation of a difficult technical process or an intricate piece of machinery in motion on the screen helps to tell a story far better than hundreds of words, the management of the Sixth National Exposition of the Chemical Industries has provided a motion picture program that is nothing short of fascinating. In the quiet and comfort of a theatre chair the spectator can see for himself the many stages that enter, for instance, into the manufacture of sulphuric acid; or how the most delicate flavoring extracts are produced from coal; or how salt is produced for the chemical industries. Among the reels to be shown during the week of the exposition, both with and without explanatory lecture and comment, are:—

"The Story of Sulphuric Acid," "The Production of Salt for the Chemical Industries," "Perfumes of the World," "A New Chemical Industry: Leather From the Ocean: Fish Leather," "Modern Coke and Gas Manufacture," "The Story of Petroleum Oil," "The Story of Coal," "Building, Mining and Quarrying Machinery," "Producing Pumps and Engines," "Silver Mining in Ontario," "Gold Mining in Ontario," "The Manufacture of Pottery," "Manufacture of Asbestos," "Silks and Satins," "Foamite Firefoam Extinguishing Apparatus at Work," "Continuous Motion, Conveying, Stacking, Elevating, Loading and Unloading Machinery," and "The U. S. Ammonium Nitrate Plant No. 2 at Mussel Shoals, Alabama."

Embraced in the foregoing are motion pictures that took considerable time and a great deal of money to produce. They feature no high-priced stars, but instead portray graphically the intimate details of industries that are of inestimable importance to the nation's welfare. Here is a chance to see what is meant by the phrase "key industries." Don't miss the movies!

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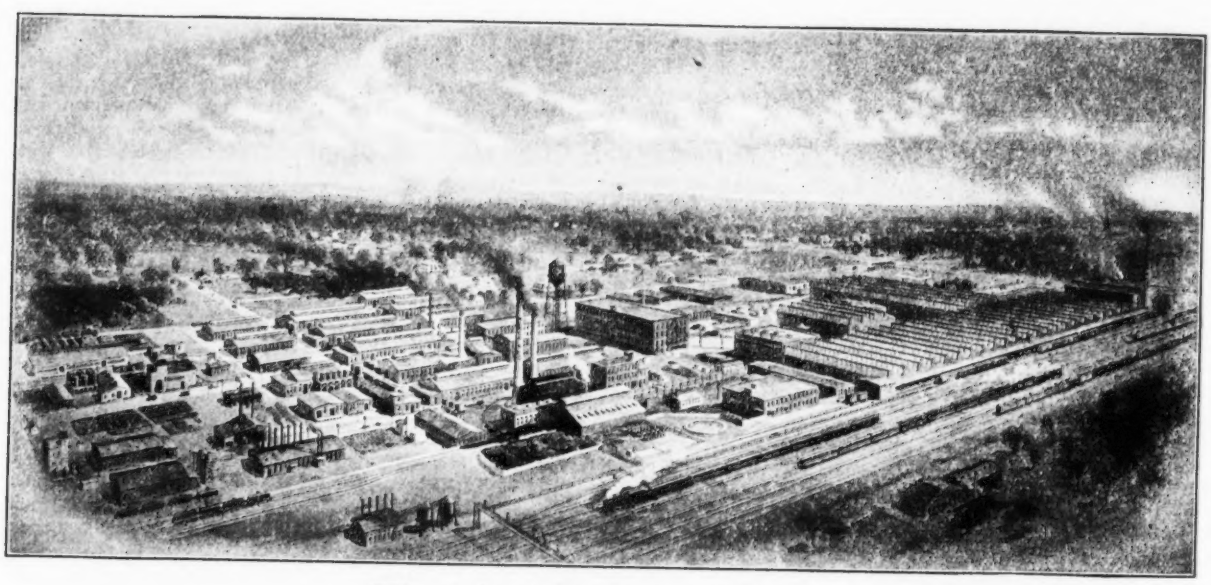

Works at Rahway, N. J.

MEDICINAL **ANALYTICAL**

Chemicals

PHOTOGRAPHIC **TECHNICAL**

Official Program of Exercises For Entire Week

Symposiums Prepared by the Exposition Management on Fuel Economy, Industrial Management, Materials Handling, Chemical Engineering and Ceramics—Motion Pictures Illustrate a Wide Range of Industrial Chemical Operations

PROGRAM

The Exposition hours are from 12 noon to 10.30 p. m.

All motion pictures will be shown in Coliseum Auditorium.

All general addresses will be made in Coliseum Auditorium.

Places for meetings of societies will be announced on bulletin boards at main entrance to Coliseum and First Regiment Armory.

MONDAY, September 20

8.00 P. M.—Opening address by Charles H. Herty.
"Co-operation in the Industries," Charles L. Reese.
Sir George E. Foster, Canadian Minister of Trade and Commerce, will speak.
"Problems Confronting the American Exporter," Erastus Hopkins (Gaston, Williams & Wigmore, Inc.).
Followed by motion pictures:
1. "Hopewell, Virginia: A Great Industrial City" (two reels). (Courtesy Du Pont Chemical Co.)
2. "The U. S. Ammonium Nitrate Plant No. 2 at Muscle Shoals" (two reels). (Courtesy Dwight P. Robinson & Co.)
3. "Modern Packing Methods" (four reels). (Courtesy Pneumatic Scale Corporation.)

TUESDAY, September 21

Fuel Economy Symposium

2.00 P. M.—Chairman's address, R. C. Beadle, managing editor "Combustion."
"Burning Coal at 100 Per Cent. B.t.u. Efficiency," W. O. Rankin, of Quigley Furnace Specialties Co.
"Saving Fuel by Controlling Chimney Losses," F. F. Uehling, of Uehling Instrument Co.
"Fluid Heat Transmission." Alexander B. McKechnie, of Parks-Cramer Co.
"Producer Gas and the Modern Mechanical Producer," W. B. Chapman, of Chapman Engineering Co.
"Refractory Cement: Life Insurance for a Furnace." F. W. Reisman, of Quigley Furnace Specialties Co.
"Preventing Condition and Radiation Heat Waste," S. L. Barnes, of Armstrong Cork Co.
"Increasing Condition and Reducing Fuel Consumption," W. R. Van Nortwick, of The Roto Co.
"The Reason for the Fuel Saving in the Dressler Kiln," Conrad Dressler, of American Dressler Tunnel Kilns, Inc.
Extemporaneous address, by W. A. Magan, of Magnesia Association of America.
Four Minute Speaker; H. K. Moore, "Why We Need Tables of Constants."

Motion Pictures

8.00 P. M.—Great U. S. chemical industries:
1. The Story of Sulphuric Acid" one reel). (Courtesy General Chemical Co.)
2. "The Production of Salt for the Chemical Industry" (one reel). (Courtesy International Salt Co.)
3. "Perfumes for the World." (Courtesy Antoine Chiris Co.)
4. "A New Chemical Industry: Leather From the Ocean: Fish Leather" (three reels). (Courtesy Ocean Leather Co. and Ford Educational Film Co.)

WEDNESDAY, Septembmer 22

Industsrial Management Symposium

2.00 P. M.—"Ultra Analysis of Costs," Harrington Emerson, of the Emerson Engineers.
"Research in Industrial Conservation," H. E. Howe, chairman, Division of Research Extension, National Research Council.
"Progress of the American Coal-Tar Industry," Grinnell Jones, of U. S. Tariff Commission.

Materials Handling Symposium

3 P. M.—Chairman's address, Roy V. Wright, editor of "Material Handling Cyclopedia."
"Material Handling: The Paramount Problem," J. H. Leonard, editor of 'Freight and Terminal Engineering."
"Bringing the Food to the Table," by Rumsey W. Scott, of Technical Advisory.
"Cost Cutting With Conveyors," W. T. Spivey, of Material Handling Engineer.
Four Minute Speaker; H. E. Howe, "Plans for Tables of Constants."
"Steel Collapsible Shipping Containers as Related to the Chemical Industries," Everett W. Morgan, of Pneumatic Scale Corporation.
"Chain Power Transmission," F. G. Anderson, of Morse Chain Co.
8.00 P. M.—Meeting of Chemical Warfare Post. (Speakers to be announced.)

THURSDAY, September 23

Chemical Engineering Symposium

2.00 P. M.—Meeting of the American Institute of Chemical Engineers, David Wesson, chairman.
"A New Method of Destructive Distillation," Thomas W. Pritchard, of Fuel Products Corporation.
"Nitration of Hydrocarbons," A. Hough and W. Savage.
"Recoverance: A Physical Property in Material and Its Importance," Robert G. Guthrie, of Widney Test Laboratories.
Four Minute Speaker; Charles H. Henry, "Another Weapon for Defense."
"Operating Data of a Modern By-Product Coke Oven Plant," C. R. Bellamy.
"Canada and the Chemist," C. Price Green, of Canadian National Railways.
"Utilization of Peat" (illustrated). B. F. Haanel, of Canada Department of Mines.
"Corrosion of Iron and Steel as Affecting the Industries," W. D. Richardson, of Swift & Co.
6.30 P. M.—Dinner of American Institute of Chemical Engineers at the Technology Club.

Motion Pictures

8.00 P. M.—Great U. S. chemical industries:
1. "Modern Coke and Gas Manufacture" (three reels). (Courtesy The Koppers Co.)
Four Minute Speaker; R. P. Fuschells, "Working Tools."
2. "The Story of Petrolum Oil (three reels). (Coutesy Standard Oil Co. of New Jersey.)
3. "The Asphalt Paving Industry" (one reel). (Courtesy Barber Asphalt Paving Co.)
4. "Colloidal Movement in Asphalt" (one reel). (Courtesy Barber Asphalt Paving Co.)

FRIDAY, September 24

2.00 P. M.—Ceramic Symposium. (Meeting of the American Ceramic Society. R. H. Minton, chairman.)
"The Significance Attached to the Term 'Ceramics' in Ancient and Modern Usage." Committee report, condensed.
"A Classification of Sheet Steel Enamels," R. R. Danielson (U. S. Bureau of Standards.)
Four-Minute Speaker, Robert La Barron, "Economy in Assembled Data."

8 P. M.—Motion Pictures

Mining Industries:
1. "The Story of Coal" (four reels). (Courtesy Sullivan Machinery Co. and U. S. Bureau of Mines.)
2. "Building, Mining and Quarrying Machinery" (two reels). (Courtesy Sullivan Machinery Co.)
3. "Producing Pumps and Engines" (one reel). (Courtesy Midwest Engine Co.)
4. "Silver Mining in Ontario" (one reel).
5. "Gold Mining in Ontario" (one reel). (Courtesy Ontario Department of Mines.)
6. "The Manufacture of Pottery" (one reel). (Courtesy American Ceramic Society.)

SATURDAY, September 25.

2 P. M.-6 P. M.

Motion Pictures to be announced.

8 P. M.—Motion Pictures

1. "Manufacture of Asbestos" (one reel).
2. "Silks and Satins" (two reels). Both by courtesy Bureau of Commercial Economics.)
Four-Minute Speaker, R. H. Wolf, "Importance of Constants in Industry."
3. "Foamite Firefoam Extinguishing Apparatus at Work" (one reel). (Courtesy Foamite Firefoam Co.)
4. "Continuous Motion, Conveying, Stacking, Elevating, Loading and Unloading Machinery" (one reel). (Courtesy Brown Portable Machinery Co.)
5. "The U. S. Ammonium Nitrate Plant No. 2 at Muscle Shoals, Alabama" (two reels). (Courtesy Westinghouse-Church-Kerr, Inc.)

Alphabetical List of Exhibitors

A

Space. Name and Address.
87-88. Abbe, Paul O., Inc., New York city.
77-78. Abbe Engineering Co., New York city.
554. Ainsworth, Wm., & Sons, Denver, Colo.
482-483. Ajax Electrothermic Corp., Trenton, N. J.
482-483. Ajax Metal Co., Philadelphia, Pa.
232. Alberene Stone Co., New York city.
231. Alcohol Products Co., New York city.
476. Alexander, W. H., New York city.
402. Allen Electrolytic Cell Corp., Portland, Me.
241. Allis-Chalmers Manufacturing Co., New York city.
292-3-4. American Aniline Products, Inc., New York city.
750. American Ceramic Society, Alfred, N. Y.
447. American Chemical Society, New York city.
319-320. American Chemical & Manufacturing Co., Norfolk, Va.
210-210a. American Chemical & Sugar Machinery Co., Philadelphia, Pa.
90. American Cyanamid Co., New York city.
460. American Dressler Tunnel Kilns, New York city.
314-15-16. American Dyes Institute, New York city.
741. American Dyestuff Reporter, New York city.
450. American Electrochemical Society, New York city.
743. American Fertilizer, The, Philadelphia, Pa.
244-245. American Hard Rubber Co., New York city.
438. American Kron Scale Co., New York city.
751. American La France Fire Engine Co., Elmira, N. Y.
279-280. American Metal Co., Ltd., New York city.
604. American Metal Products Co., Milwaukee, Wis.
740. American Pulverizer Co., St. Louis, Mo.
715. American Steel & Wire Co., New York city.
4. American Transformer Co., Newark, N. J.
420. American Water Softener Co., Philadelphia, Pa.
6. Anaconda Copper Mining Co., Perth Amboy, N. J.
5. Anaconda Lead Products Co., Perth Amboy, N. J.
7. Anaconda Rolling Mill Dept., Perth Amboy, N. J.
273-274. Angel H. Reeve & Co., Inc., New York city.
201-2-3-4. Aniline Dyes & Chemicals, Inc., New York
758-759. Aniline Sales Corp., New York city.

Space. Name and Address.
267-268. Anti-Hydro Waterproofing Co., New York city.
764-765. Anthrakone Dye Products & Chemical Co., New York city.
287. Apex Chemical Co., New York city.
510. Arkell Safety Bag Co., New York city.
246-247. Arnold, Hoffman & Co., New York city.
612. Armstrong Cork & Insulation Corp., Pittsburgh, Pa.
494. Aterite Co., Inc., Paterson, N. J.
613. Atlantic Dyestuff Co., Boston, Mass.
414. Atlas Electric Devices Co., Chicago, Ill.
735. Avery Rock Salt Mining Co., New York city.

B

737. Babbitt, B. T., New York city.
610. Bacharach Industrial Inst. Co., Pittsburgh, Pa.
336-337. Bachmeier & Co., New York city.
559-60-61. Bailey Meter Co., Cleveland, Ohio.
333. Baker, J. T., Chemical Co., Phillipsburg, N. J.
63. Baker, Joseph, & Sons & Perkins Co., Inc. (Werner & Pfleiderer Machinery), White Plains, N. Y.
82. Barber Asphalt Paving Co., Philadelphia, Pa.
19-18. Barrett Co., The, New York city.
306-307. Bausch & Lomb Optical Co., Rochester, N. Y.
77. Beach-Russ Co., New York city.
732. Beaver Chemical Co., Damascus, Va.
537-538. Becker Christian, Inc., New York city.
506. Beckley Perforating Co., Garwood, N. J.
13. Bethlehem Foundry & Machine Co., Bethlehem, Pa.
444. Blackmer Rotary Pump Co., Detroit, Mich.
408. Blakiston's, P., Son & Co., Philadelphia, Pa.
462-463. Booth Electric Furnace Co., Chicago, Ill.
738. Boyer Oil Co., Inc., New York city.
738. Boyer Oil Manufacturing Co., Indianapolis, Ind.
84. Bristol Company, The, Waterbury, Conn.
41. Brown Instrument Co., Philadelphia, Pa.
685 and 692. Brown Portable Conveying Machinery Co., Chicago, Ill.
253. Buckman & Pritchard, Inc., Mineral City, Fla.
23-4-5-6-7. Buffalo Foundry & Machinery Co., Buffalo, N. Y.

Space. Name and Address.
675. Burrell Technical Supply Co., Pittsburgh, Pa.

C

70. Calco Chemical Co., New York city.
442. California Alkali Co., Cartago, Calif.
471. Canada Carbide Co., Montreal, Que.
473. Canada: Dominion Water Power Branch, Ottawa, Ont.
487. Canada: Iron & Steel of—, Gardenvale, P. Q.
491-492. Canada: Ontario Bureau of Mines, Toronto, Ont.
487. Canada: Pulp & Paper Magazine of—, Gardenvale, P. Q.
472. Canada: Shawinigan Electrometals Co., Montreal, Que.
471. Canada: Shawinigan Products Co., New York city.
471-472. Canada: Shawinigan Water & Power Co., Montreal, Que.
488. Canadian Chemical Journal, Toronto, Ont.
471. Canada Electrode Co., Montreal, Que.
472. Canadian Electro Products Co., Montreal, Que.
487. Canadian Mining Journal, Gardenvale, P. Q.
487. Canadian Textile Journal, Gardenvale, P. Q.
489-490. Canadian Pacific Railway, Montreal, Que.
56. Carborundum Co., The, Niagara Falls, N. Y.
1-2. Carrier Engineering Co., New York city.
14. Celite Products Co., New York city.
12. Celluloid Zapon Co., New York city.
496-7-8. Central Scientific Co., Chicago, Ill.
54. Chadwick-Boston Lead Co., Boston, Mass.
74. Chapman Engineering Co., Mt. Vernon, Ohio.
74. Chapman Stein Furnace Co., Mt. Vernon, Ohio.
642. Chapman Valve Manufacturing Co., New York city.
495. Chemical Age, The, New York city.
29. Chemical Catalog Co., Inc., New York city.
281-282. Chemical Co. of America, New York city.
443. Chemical Color & Oil Daily, New York city.
517. Chemical Equipment Co., Chicago, Ill.
42. Chemical & Metallurgical Engineering, New York city.
505. Chemical Pump & Valve Co., Perth Amboy, N. J.
400. Chemical Warfare Service, Washington, D. C.

GENERAL CHEMICAL COMPANY
MAKERS OF STANDARD CHEMICALS

The growth of the General Chemical Company to the national institution it is today is due to the organized, collective endeavors of its technical and executive staff and to the good faith which it has consistently kept with its thousands of customers in this country and abroad. With its vast experience in the manufacture of Acids and Chemicals, the General Chemical Company is able to furnish highly standardized products which meet the most exacting specifications.

ACIDS
- Acetic
- Aqua Fortis
- Arsenic
- Battery
- Butyric
- Chlorsulphonic
- Electrolyte
- Hydrochloric
- Hydrofluoric
- Hydrofluosilicic
- Mixed
- Muriatic
- Nitric

ACIDS (Cont'd)
- Phosphoric
- Propionic
- Sulphuric
- Valeric
- White

ACETIC ANHYDRIDE

ALUM (Ammonia) U. S. P.

ALUMINUM SULPHATE

AMMONIA
- Aqua
- Bifluoride

ACETYL CHLORIDE

COPPER
- Sulphate
- Nitrate

IRON
- Nitrate
- Sulphate
- Sulphide

LEAD
- Acetate

MAGNESIUM
- Fluosilicate
- Sulphate

PHOSPHOROUS
- Pentachloride
- Oxychloride

SODIUM
- Acetate
- Bisulphate
- Bisulphite
- Carbonate
- Phosphate—Dibasic
- Phosphate—Pyro
- Phosphate—Tribasic
- Fluoride
- Hydrate
- Hyposulphite
- Silicate

SODIUM (Cont'd)
- Sulphate
- Sulphide
- Sulphite

SODIUM ALUMINUM SULPHATE

SULPHUR
- Refined
- Commercial

TIN
- Crystal-Muriate
- Bichloride
- Oxymuriate
- Nitromuriate
- Tetrachloride

ZINC SULPHATE

Baker & Adamson "B & A" Acids and Reagent Chemicals Builders of The Herreshoff Furnace "Orchard" Brand Insecticides
RYZON—The Perfect Baking Powder

SALES OFFICES: BALTIMORE BUFFALO CHICAGO CLEVELAND DENVER EASTON NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE SAN FRANCISCO SEATTLE
THE NICHOLS CHEMICAL COMPANY, LTD., MONTREAL CANADA

Space. Name and Address.

464. Chemists' Club, The, New York city.
308-9-10-11. Chiris Antoine Co., Delawanna, N. J.
643. Clapp Products Co., Boston, Mass.
256-267. Cleveland Cliffs Iron Co., Cleveland, Ohio.
610. Cleveland Instrument Co., Cleveland, Ohio.
291. Clinchfield Products Corp., New York city.
425. Clipper Belt Lacer Co., Grand Rapids, Mich.
740. Color Trade Journal, New York city.
700. Combustion, New York city.
317. Commercial Solvents Corp., New York city.
722. Consolidated Chemical Products Co., Alton, Ill.
432. Contact Process Co., Buffalo, N. Y.
719-720. Container Club, The, Chicago, Ill.
338-39-40-41. Corning Glass Works, Corning, N. Y.
429-430. Crane Co., Chicago, Ill.
536. Crane Packing Co., Chicago, Ill.
684. Crescent Sales & Engineer Co.. Detroit, Mich.

D

682. Davidson, M. T., Co., New York city.
637-638. Davison Chemical Co., Baltimore, Md.
531-2-3. De Laval Separator Co., New York city.
529-530. Denver Engineering Works Co., Denver, Colo.
479. Dermatological Research Laboratories, Philadelphia, Pa.
468-69-70. Detroit Electric Furnace Co., Detroit, Mich.
81. Detroit Range Boiler & Steel Barrel Co., Detroit, Mich.
15. Devine, J. P., Co., Buffalo, N. Y.
624-625. Diamond State Fibre Co., Bridgeport, Pa.
662-663. Dicks, David, Co., New York city.
548-549. Dings Magnetic Separator Co., Milwaukee, Wis.
473. Dominion Water Power Branch, Ottawa, Ont.
51-52. Dorr Co., The, New York city.
79. Dow Chemical Co., Midland, Mich.
252. Drackett, P. W., & Sons Co., Cincinnati, Ohio.
544-545. Draper Manufacturing Co., Cleveland, Ohio.
569-70-71. Drying Systems, Inc., Chicago, Ill.
740. Dunning Lueckel Engineer Co., New York city.
8-7. Du Pont, E. I., de Nemours Co., Wilmington, Del.
631. Du Pont Chemical Co., Wilmington, Del.
43. Duriron Castings Co., Dayton, Ohio.

E

524-5-6. Eagle Picher Lead Co., Chicago, Ill.
217-18-19-20-21. Eastman Kodak Co., Rochester, N. Y.
656-657. East Jersey Pipe Co., Paterson, N. J.
423-424. Economic Machinery Co., Worcester, Mass.
434-435. Economy Engineering Co., Chicago, Ill.
231. Edgar Bros. Co., Metuchen, N. J.
752-753. Egyptian Lacquer Manufacturing Co., New York city.
58. Eimer & Amend, Inc., New York city.
448-449. Electric Furnace Co., Alliance, Ohio.
321-322. Electro Bleaching Gas Co., New York city.
401-402. Electron Chemical Co., Portland, Me.
277-278. Electrolytic Zinc Co., Inc., New York city.
209. Elmore, G. H., Philadelphia, Pa.
82. Elyria Enameled Products Co., Elyria, Ohio.
344. Empire Laboratory Supply Co., New York city.
500. Engelhard, Charles, New York city.
37-38. Everlasting Valve Co., New York city.
732-733. Excelsior Dyestuff & Chemical Co., New York city.

F

754-755. Falcon Dye & Chemical Co., New York city.
467. Fansteel Products Co., North Chicago, Ill.
674. Fertilizer Green Book, Chicago, Ill.
242-243. Fleisher, W. L., & Co., New York city.
513. Florasynth Laboratories, Inc., Unionport, Bronx, N. Y.
621. Foamite Firefoam Co., New York city.
66. Foote Mineral Co., Philadelphia, Pa.
346-347. Foxboro Co., The, Inc., Foxboro, Mass.
609. Fuel Products Corp., New York city.

G

284-285. Garrigue, Wm., & Co., New York city.
716-717. Garrigues Co., Chas. F., New York city.
3. General Bakelite Co., New York city.
742. General Briquetting Co., New York city.
2-222-223-224. General Ceramics Co., New York city.
17-18. General Chemical Co., New York city.
5. General Electric Co., Schenectady, N. Y.
427. General Electric Co. (Lake Erie Chemical Works), Nela Park, Cleveland, Ohio.
251. General Filtration Co., Inc., Rochester, N. Y.
227. General Fire Extinguisher Co., Providence, R. I.
712-13-14. Geigy Co., Inc., New York city.
54. Georgia Lead Works, Atlanta, Ga.
54. Gibson & Price Co., Cleveland, Ohio.
508-9 and 523. Glamorgan Pipe & Foundry Co., Lynchburg, Va.
678-679. Glass Coating Co., Cleveland, Ohio.
32. Glens Falls Machine Works, Glens Falls, N. Y.
228-29-30. Gordon Dryer Corp., New York city.
711. Gottesman, M., & Co., Inc., New York city.
47. Goulds Manufacturing Co., Seneca Falls, N. Y.
215-216. Greiner, Emil, Co., New York city.
772-773. Greeley Products Corp., New York city.
227. Grinnell Co., Inc., Providence, R. I.
50. Groch Centrifugal Flotation, Ltd., Cobalt, Ont.
88. Gruendler Patent Crusher & Pulv. Co., St. Louis, Mo.

H

451-452. Hamilton & Hansell, Inc., New York city.
499-500. Hanovia Chemical & Manufacturing Co., Newark, N. J.
60. Hardinge Co., New York city.
703. Hauser-Stander Tank Co., Cincinnati, Ohio.
441. Hays, Jos. W., Corp., Michigan City, Ind.
250. Haynes Stellite Co., Kokomo, Ind.
751. Hayward, S. F., & Co., New York city.
201. Hellmuth, Charles, Inc., New York city.
35-36. Hepworth, S. S., Co., New York city.
226. Herold China & Pottery Co., Golden, Colo.
323-4-5. Hercules Powder Co., Wilmington, Del.
680-681-696-697-71. Hercules Engineering Corp., New York city.
701. Heyl Laboratories, Inc., New York city.
636. Heyden Chemical Co. of America, Garfield, N. J.
410. Hood, B. Mifflin, Brick Co., Atlanta, Ga.
10-11. Hooker Electrochemical Co., New York city.
296-297. Hoskins Manufacturing Co., Detroit, Mich.
54. Hoyt Metal Co., St. Louis, Mo.
44. Huff Electrostatic Separator Co., Arlington, Mass.
493. Hunter Dry Kiln Co., Indianapolis, Ind.
567. Huyck, F. C., & Sons, Albany, N. Y.
736. Hydrocarbon Chemical Co., Lancaster, Pa.

I

Space. Name and Address.

476. Ideal Stencil Machines, Philadelphia, Pa.
641. Imperial Dyewood Corp., New York city.
565-566. Independent Chemical Co., New York city.
454-455. Industrial Electric Furnace Co., Chicago, Ill.
467. Industrial & Educational Press, Gardenvale, P. Q.
67. Industrial Filtration Corp., New York city.
745-746. Innis Speiden & Co., Inc., New York city.
44. International Carbon Products Co., Arlington, Mass.
722. International Cooperage Co., Niagara Falls, N. Y.
456-57-58. International Nickel Co., 120 Broadway, New York city.
735. International Salt Co., New York city.
487. Iron & Steel of Canada, Gardenvale, P. Q.
440. Irving Iron Works Co., Long Island City, N. Y.

J

766-767. Jacques Wolf & Co., Passaic, N. J.
428. Jewell Polar Co., Chicago, Ill.
635. Joplin Whiting Co., Joplin, Mo.
29. Journal of Industrial & Engineering Chemistry, New York city.
A-Mez. Fl. Journal of Commerce, The, New York city.

K

555-556. Kalbfleisch Corp., The, New York city.
668. Kellogg, M. W., Co., Inc., New York city.
405-406. Kenart Synthetic Products Co., Chicago, Ill.
497. Kewaunee Manufacturing Co., Kewaunee, Wis.
565. King Chemical Co., New York city.
617-18-19. Klipstein, A., & Co., New York city.
484-5-6. Knight, Maurice A., East Akron, Ohio.
326 to 331, incl. Knoxville Board of Commerce, Knoxville, Tenn.
312-313. Koppers Co., The, Pittsburgh, Pa.
312. Koppers Products Co., Pittsburgh, Pa.
342. Koven, L. O., & Bro., Jersey City, N. J.

L

427. Lake Erie Chemical Works of General Elec. Co., Nela Park, Cleveland, Ohio.
667 and 674. Lakewood Engineering Co., Cleveland, Ohio.
756-757. Lamie Chemical Co., Huntington, . Va.
345. Lammert & Mann, Chicago, Ill.
733. Laurel Soap Manufacturing Co., Philadelphia, Pa.
465. Lead Lined Iron Pipe Co., Wakefield, Mass.
55. Leeds & Northrup Co., Philadelphia, Pa.
627. Liberty By-Products Co., New York city.
520-521. Lindsay Light Co., Chicago, Ill.
403. Liquid Carbonic Co., Chicago, Ill.
633. Loomis-Manning Filter Distrib. Co., Philadelphia, Pa.
283. Lungmotor Co., The, Boston, Mass.
260-261. Lunkenheimer Co., The, Cincinnati, Ohio.
734. Luzerne Rubber Co., Trenton, N. J.

M

620. Maas & Waldstein Co., New York city.
421-422. Magnetic Manufacturing Co., Milwaukee, Wis.
658. Magnesia Association of America, Philadelphia, Pa.
433. Mann & Cook, New York city.
318. Manufacturers Record, Baltimore, Md.
206-7-8. Mathieson Alkali Works, Inc., New York city.
87. Mead & Co., Detroit, Mich.
89. Merck & Co., New York city.
213-214. Merrill Co., The, San Francisco, Calif.
277-278. Metals Disintegrating Co., New York city.
525. Midland Chemical Co., Chicago, Ill.
550-551. Midwest Engine Co., Indianapolis, Ind.
675. Mine Safety Appliance Co., Pittsburgh, Pa.
59. Mine & Smelter Supply Co., New York city.
231. Miner-Edgar Co., New York city.
9. Mineral Point Zinc Co., New York city.
629. Mobile & Ohio Railroad Co., Washington, D. C.
677. Mojonnier Bros. Co., Chicago, Ill.
412. Monarch Manufacturing Works, Inc., Philadelphia, Pa.
457. Monel Metal Products Co., Bayonne, N. J.
661. Mono Corp. of America, Buffalo, N. Y.
611. Morse Chain Co., Ithaca, N. Y.
75. Mott, J. L., Iron Works, New York city.
254-255. Multi Metal Co., Inc., New York city.

N

91. Nash Engineering Co., South Norwalk, Conn.
634. Nassau Valve and Pump Corporation, Rockville Center, N. Y.
20-21-22. National Aniline and Chemical Co., New York city.
718. National Binding Machine Co., New York city.
518. National Filter Cloth and Weaving Co., Brooklyn, N. Y.
28. National Gum and Mica Co., New York city.
427. National Lamp Works of General Electric Co., Nela Park, Cleveland, Ohio.
735. Nelson, Alfred W., Brooklyn, N. Y.
298-299. Newark Wire Cloth Co., Newark, N. J.
639. New England Tank and Tower Co., Everett, Mass.
8-9. New Jersey Zinc Co., New York city.
408. New Method Utilities Co., Newark, N. J.
62. Newport Chemical Works, Inc., New York city.
626-27-28. New York Color and Chemical Co., New York city.
729. New York Container Co., Inc., New York city.
673. New York Commercial, New York city.
314-315. Niagara Alkali Co., Niagara Falls, N. Y.
265. Niagara Electric Chemical Co., Niagara Falls, N. Y.
622-623. Nichols Copper Co., New York city.
666. Nitro Products Co., New York city.
207. Nitrogen Corporation, Providence, R. I.
683. Northwestern Chemical Co., Wauwatosa, Wis.
34. Norton Co., Worcester, Mass.

O

466. Obermayer, S., Co., The, Pittsburgh Pa.
286. Oil, Paint and Drug Reporter, New York city.
269-270. Oliver Continuous Filter Co., New York city.
491-492. Ontario Bureau of Mines, Toronto, Ontario.
294-295. Organic Salt and Acid Co., 81 Fulton street, New York city.
429. Oxygen Products Co., New York city.
515-516. Ozone Co. of America, Milwaukee, Wis.

P

Space. Name and Address.

93. Palo Co., The, New York city.
695. Paper Mill and Wood Pulp News, New York city.
552-553. Parks Cramer Co., Fitchburg, Mass.
441. Payne, Stephen H., New York city
38. Pennsylvania Salt Manufacturing Co., Philadelphia, Pa.
480-481. Permutit Co., The, New York city.
568. Perry & Webster, Inc. (formerly The Kalbperry Corporation), New York city.
519. Peterson, Leonard & Co., Chicago, Ill.
264. Perth Amboy Chemical Works, Perth Amboy, N. J.
73. Pfaudler Co., Rochester, N. Y.
289-290. Philadelphia Drying Machinery Co., Philadelphia, Pa.
501. Philadelphia Quartz Co., Philadelphia, Pa.
474. Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
415-16-17. Pneumercator Co., Inc., New York city.
730. Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass.
704. Porete Manufacturing Co., North Newark, N. J.
698-699. Power Specialty Co., New York city.
659. Powers Regulator Co., New York city.
744. Powhatan Mining Co., Baltimore, Md.
541-42-43. Pratt Engineering and Machine Co., New York city.
80. Precision Instrument Co., Detroit, Mich.
640. Procter & Gamble Distributing Co., Cincinnati, Ohio.
702. Protecto Safety Appliance Co., Newark, N. J.
233-34-35-36. Proctor & Schwartz, Philadelphia, Pa.
78. Provost Engineering Co., New York city.
487. Pulp and Paper Magazine of Canada, Gardenvale, P. Q.
288. Pyrolectric Instrument Co., Trenton, N. J.
644-645. Press Headquarters.

Q

539-540. Quigley Furnace Specialties Co., New York city.

R

665. Raritan Aniline Works, New York city.
6. Raritan Copper Works, Perth Amboy, N. J.
49. Raymond Bros. Impact Pulv. Co., Chicago, Ill.
54. Raymond Lead Works, Chicago, Ill.
445-446. Refinite Co., Omaha, Neb.
512. Republic Flow Meters Co., Chicago, Ill.
4. Research Corporation, New York city.
258-259. Revolvator Co., The, Jersey City, N. J.
760-761. Rhodia Chemical Co., New York city.
12. Richards Co., New York city.
54. Robertson, Jas., Lead Works, Baltimore, Md.
426. Robinson, Dwight P., & Co., Inc., New York city.
727. Rockhill & Vietor Co., New York city.
264-265-266. Roessler & Hasslacher Chemical Co., New York city.
292-293. Rollin Chemical Corp., New York city.
441. Roto Co., The, Hartford, Conn.
83. Ruggles Coles Engineering Co., New York city.
686. Ruger Textile Color Co., Brooklyn, N. Y.

S

643. Salmon Falls Manufacturing Co., Boston, Mass.
504. Sarco Co., New York city.
502-503. Schaar & Co., Chicago, Ill.
65. Schaeffer & Budenberg Manufacturing Co., Brooklyn, N. Y.
431. Schwartz Sectional System, Indianapolis, Ind.
498. Scientific Equipment Co., New York city.
316. Scott, Ernest & Co., Fall River, Mass.
751. Scott & Co., Henry L., Providence, R. I.
16. Semet-Solvay Co., Solvay, N. Y.
271-272. Seydel Manufacturing Co., The, Jersey City, N. J.
507. Seymour & Peck Co., Chicago, Ill.
94. Sharples Specialty Co., Philadelphia, Pa.
472. Shawinigan Electrometals Co., Montreal, Que.
471. Shawinigan Products Co., New York city.
471-472. Shawinigan Water and Power Co., Montreal, Que.
48. Sherwin-Williams Co., The, New York city.
39. Sidio Co. of America, Inc., New York city.
205. Siegel Corporation of America, Rosebank, S. I., N. Y.
693. Simmons, John, Co., New York city.
709-710. Sly, W. W., Manufacturing Co., Cleveland, Ohio.
16. Solvay Process Co., Solvay, N. Y.
632. Southern Cotton Oil Co., New York city.
629-630. Southern Railway System, Washington, D. C.
72. Sowers Manufacturing Co., Buffalo, N. Y.
534-535. Sparks, John C., New York city.
627. Stamford Dyewood Co., New York city.
566. Stauffer Chemical Co., Chauncey, N. Y.
211-212. Stein, Hall & Co., Inc., New York city.
565. Sterling Color Co., New York city.
616. Sticht, Herman H., & Co., New York city.
557-558. Stimpson Equipment Co., Salt Lake City, Utah.
85-86. Stokes, F. J., Machinery Co., Philadelphia, Pa.
691. Stratford Chemical Co. New York city.
30-31. Sturtevant Mill Co., Boston, Mass.
459-460. Sullivan Machinery Co., Chicago, Ill.
562-63-64. Sunbeam Chemical Co., Chicago, Ill.
64. Swenson Evaporator Co., Chicago, Ill.

T

475. Taber Pump Co., Buffalo, N. Y.
275-276. Tagliabue, C. J., Manufacturing Co., Brooklyn, N. Y.
763 Takamine Commercial Corporation, New York city.
762-763. Takamine Laboratory, Inc., New York city.
762. Tanner, Char. S., Co., Providence, R. I.
248-249. Taylor Instrument Companies, Rochester, N. Y.
680-681. Technical Products Co., Inc., New York city.
747-748. Texas Gulf Sulphur Co., New York city.
514. Textile Colorist, Philadelphia, Pa.
511. Textile World Journal New York city.
477. Textiles, Boston, Mass.
666. Thatcher Process Co., Syracuse, N. Y.
57. Thermal Syndicate, Ltd., New York city.
232-233. Thermo Electric Instrument Co., Newark, N. J.
527-528. Thomas, Arthur H., Co., Philadelphia, Pa.
40. Thwing Instrument Co., Philadelphia, Pa.

Chemical Stoneware

Made in America by Americans who know how

MAURICE A. KNIGHT ACID PROOF CHEMICAL STONEWARE AKRON, OHIO, U.S.A.

A Few Important Facts

THIS TRADE MARK stamped into the body of chemical stoneware means: that it is guaranteed acid proof through the entire body, tough and durable and not brittle or fragile like common ware,—that it is free from checks, blisters or other defects and does not leak or sweat and must be perfectly satisfactory to you.

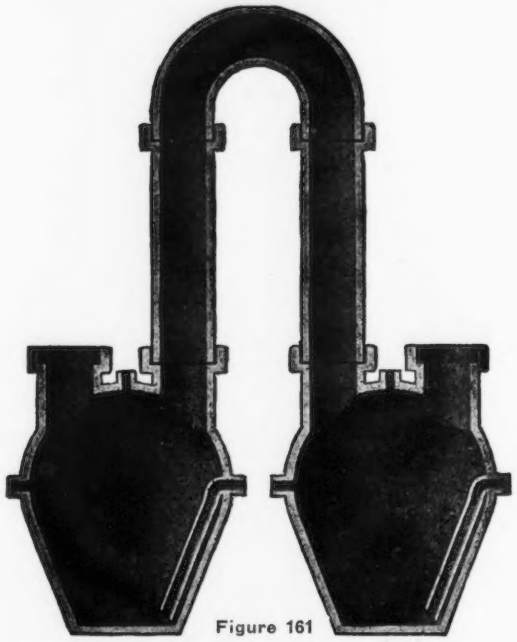

Figure 161

MURIATIC RECEIVERS OR JUGS

With connecting piping and fittings. Made thin, but strong and durable. Made in all designs and sizes. Standards—35-Gal. with 6-in. socket gas inlets; 50-Gal. with 8-in. socket gas inlets. Connecting return bends, 6-in. by 18-in. to 24-in. center, 8-in. by 30-in. to 36-in. center.

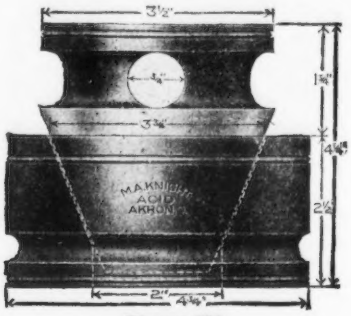

Figure 301

ACID-PROOF DROP VALVE, 2-IN.

Made in any size.

Figure 320

ACID-PROOF FILTERING FUNNEL

Made in any size.

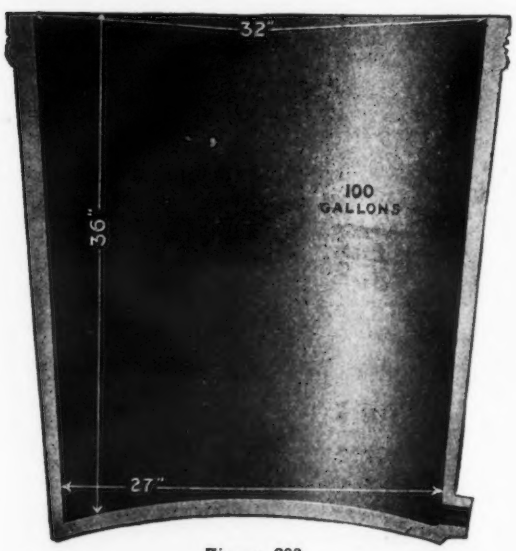

Figure 203

STANDARD TAPER 100-GAL. ACID JAR

We make jars and tanks in any size or design with covers and outlets as desired, fitted with plain bib faucet, ground to fit, if wanted.

Figure 201

ACID-PROOF STANDARD STRAIGHT SIDE JAR

Made in any capacity from 1 to 500 gallons. Outlets and inlets with openings or covers, as desired.

We do **not** depend upon a glaze enamel or veneer to make our ware acid proof.

It is the body itself.

Our **entire** organization has been making acid proof chemical stoneware for over **fifteen years.**

We are the only plant in the country which is devoted **entirely** to the manufacture of acid proof chemical stoneware.

Our ware is **not** the cheapest nor is it fancy, but it is **guaranteed** to be acid proof, free from defects, not to leak or sweat and to be perfectly satisfactory in every respect.

Our clays and method of manufacture are **not** the same as used by others in our district.

We make **every description** of acid proof chemical stoneware, from special pieces to complete plants.

We make a specialty of ware for **nitric acid** manufacture.

Our ware will withstand the action of acids, alkalies and chemicals, hot or cold, weak or strong.

We do not give a **promise** of quick delivery to procure your order, then disappoint you.

Our motto: **Service and honesty in deliveries.**

SEE OUR EXHIBIT
at the
Sixth National Exposition of Chemical Industries
Grand Central Palace, New York
Week of September 20.
OUR BOOTHS NOS. 484, 485 AND 486

Does This Mean Anything to You?

We have a six months' stock supply of coal, clay and crating material

MAURICE A. KNIGHT Office and Factory Kelley Ave. East Akron, Ohio

Space.	Name and Address.
262-263.	Titanium Alloy Manufacturing Co., Niagara Falls, N. Y.
263.	Titanium Pigment Co., Niagara Falls, N. Y.
68-69.	Tolhurst Machine Works, Troy, N. Y.
721-728.	Tyler, W. S., Co., The, Cleveland, Ohio.

U

45.	Uehling Instrument Co., New York city.
665.	Uniform Chemical Products Co., New York city.
237-38-39-40.	Union Steam Pump Co., Battle Creek, Mich.
418.	Union Sulphur Co., New York city.
53	United Filters Corporation, New York city.
54.	United Lead Co., New York city.
54.	United Lead Co.-Tatham Bros. Works, Philadelphia, Pa.
54.	United Lead Co. of Cincinnati, Cincinnati, Ohio.
54.	United Lined Tube and Valve Co., New York city.
6.	United Metals Selling Co., Perth Amboy, N. J.
76.	United States Cast Iron Pipe and Foundry Co., Philadelphia, Pa.
300 and 305.	U. S. Industrial Alcohol Co., New York city.
305.	U. S. Industrial Chemical Co., New York city.
461.	U. S. Smelting Furnace Co., Belleville Ill.
733.	Universal Dyes and Chemical Co., Milwaukee, Wis.
738.	Universal Oil Co., Wilmington, N. C.

V

436-437.	Valley Iron Works, Williamsport, Pa.
419.	Van Nostrand Co., D., New York city.
664-65-66.	Van Winckel, W. H., New York city.
343.	Vitreous Enameling Co., Cleveland, Ohio.
566.	Vulcan Detinning Co., The, Sewaren, N. J.

W

676.	Wailes Dove-Hermiston Corporation, New York city.
225.	Wallace & Tiernan Co., Inc., New York city.
743.	Ware Bros. Co., Philadelphia, Pa.
768-69-70-71.	Warner Chemical Co., New York city.
33.	Wedge Mechanical Furnace Works, Philadelphia, Pa.
63.	Werner & Pfleiderer Machinery, White Plains, N. Y.
46.	Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.
654-655.	Wheeler, C. H., Manufacturing Co., Philadelphia, Pa.
334-335.	Whitall Tatum Co., New York city.
411.	Whitlock Coil Pipe Co., Hartford, Conn.
407.	Widney Test Laboratories, Chicago, Ill.
413.	Willson Goggles, Inc., Reading, Pa.
546-547.	Worthington Pump and Machinery Corporation, New York city.

Z

12.	Zapon Leather Cloth Co., New York city.
61.	Zaremba Co., Buffalo, N. Y.

DYE RESEARCH OF FUTURE DEPENDENT ON IMPROVEMENT IN TEACHING METHODS

Demands of Modern Chemical Research in Dye Industry Declared by Dr. Robert E. Rose to Lay Bare Defects of Our Primary Schools

Defects in the American schools were sharply criticized in a paper, "The Education of the Research Chemist," read by Dr. Robert E. Rose, a research chemist connected with the E. I. DuPont de Nemours Co., of Wilmington, Del., before the Dye Division of the American Chemical Society at the University of Chicago.

"The education of the men," said Dr. Rose, "who are to lead the dye industry to future successes is a matter of vital interest to us. The subject is equally of interest, in its general aspects, to all who teach and to all who are concerned with commercial enterprises founded on the technical application of the results obtained by research.

"The dye industry of this country was established with the aid of research men who were not trained for this special line of work; they were men of general training, and their adaptability to their new duties throws a very interesting light on the educational system of which they are the products.

"They were very successful, let that be emphasized, but at the same time let us study such faults as were apparent in order that we may learn how to improve the training given in our schools.

"The worst failings were a tendency to overlook trifling indications such as slight differences in color or structure or smell, and a disregard for the necessity for reasoning precisely and understanding clearly before doing any experiments—that is, there was a lack of exact observation coupled with rather vague reasoning.

"Of course, this was not true of the maturer men, but rather of those fresh from the training of the university. The causes of these faults lie very far back in our methods of teaching. Research is nothing strange; it is simply the use of the results of well trained powers of observation by a mind capable of clear reasoning. The child who by the careful examination of a mechanism learns how it works is applying the methods of research. The chemist examines the substances of which the world is composed, finds how they are put together, and learns how to make new ones. The essential of this kind of work is well trained senses, and the development of the senses is very largely determined during the years of early childhood. It is for this reason that we may say that the research man is made or marred during childhood and adolescence. However, we do not make a great effort to train the senses during childhood; instead, we put a premium on developing the memory and formal methods of reasoning. Later, in high school and university, we continue to give the student too many second-hand facts instead of making him observe for himself. We teach him to reverence the opinion of others rather than his own, and thereby kill that healthy skepticism which is the essence of research.

"The courses in chemistry are apt to call for an exercise of memory rather than of reasoning, though they are better in this country than in any other. The future dye chemist is called upon to learn many formulas by eye without being given a good understanding of their real meaning. Finally, the research work in our universities is hampered by the routine duties placed on the teaching staff, and therefore we find very few institutions which can be regarded as great schools of research, where many men learn from each other the enthusiasm of the true investigator. We are too apt to regard research as fulfilling, in part, the requirements for the degree of doctor of philosophy instead of adding to the sum of human knowledge.

"The remedies are easy to state, but hard to apply—the teaching of observation, the training of the senses, can be done properly only by really efficient grade school teachers, with the co-operation of parents. Some day we shall recognize the fact that the school teacher is of more importance to our supply of research men than is the college professor. Some day we shall admit that schooling, though intangible, is worth more than railroads, mills and all other material things save only food, and that it is worth paying for. Then we shall have better dye chemists.

"In the high schools and universities we need a higher average of excellence in the teaching staffs; there are very many extremely able men, but there are also many unambitious rote teachers, who teach because they find it easier to do that than anything else; men who are never up to date. We need better textbooks, especially of organic chemistry—we have nothing in this line which is in keeping with the modern development of applied organic chemistry. I do not mean a technology, but a text giving due emphasis to the applications made of knowledge expressed in the facts and theories of the classroom.

"To foster pure research we should have institutions set aside for research, institutions to develop, as the years pass, into great schools wherein the advance of the science will be aided by all the resources of the nation.

"The teaching of research is a subject of interest to all, because the measure of the success of a nation is the quality and number of her trained specialists. It is of special interest to us because the industry to which we are devoted needs, more than any other, a great number of capable research men."

RARE CHEMICAL REACTIONS

Chemist Warns Against Action of Sulphuric Acid on Certain Nitro Compounds

Warning against a dangerous chemical reaction which has recently caused several fatal accidents was sounded by M. L. Crossley, of the Calco Company, of Bound Brook, N. J., in an address before the Dye Division of the American Chemical Society in recent session at the University of Chicago. He spoke of the action of sulphuric acid on nitrocarbocyclic compounds, which are likely to occur in extensive chemical operations.

"Certain nitro compounds," said Mr. Crossley, "react with sulphuric acid under certain conditions with explosive violence producing aminophenol sulfonic acids and complex compounds of unknown composition. The reaction is exothermic and is quite general. The temperature at which the reaction takes place is just a few degrees above that at which the substances remain in contact unchanged. It is the purpose of this paper to emphasize the dangerous character of this reaction, especially when the reacting mass is large and is confined in a vessel with a closed top. On a manufacturing scale it is extremely difficult to control this reaction, and it should be guarded against in processes where it might be secondary to some main reaction. A few months ago this reaction was brought about by accident in a plant in this country, and it resulted in a bad explosion in which several men were badly injured and one man killed. It is hoped that other manufacturers will profit by this experience and thus prevent loss of life and property which would otherwise result."

NEW FERTILIZER FOUND

Is Made from Tannery Waste and Is a Powder Without Offensive Odor

A new and valuable fertilizer made from the waste of tanneries has been discovered, according to the announcement of its inventor and patentee, V. H. Kadish, of Milwaukee, who explained the process before his associates of the Leather Chemistry Section of the American Chemical Society at its recent meeting in Chicago.

Owing to the high cost of the labor formerly employed in the removing of hair from hides, many tanners now dissolve the hair by pouring over the hides a solution of sulphide of soda. Hitherto the ill smelling and dark brown liquid which resulted from this process had been discharged into the sewers and streams. Its presence in the rivers and bays affects fish life and also makes the waters unsightly.

Mr. Kadish has found a way of separating the solids in this liquor and then drying them. The resulting product is a powder without offensive odor, which is a valuable fertilizer ingredient, as it contains 12 per cent. of ammonia. Carload lots of the new product are already being produced, and it is likely that tanneries and packing houses throughout the United States will undertake the manufacture of this fertilizing material. The new process will therefore not only prevent stream pollution but will be an aid to the farmer.

COLLEGES BLAMED FOR LAX KNOWLEDGE OF HUMAN RELATIONS IN INDUSTRY

Professor Talbot Shows How Courses in Class Rooms Can Be Made to Bring Student Face to Face with Problems

Professor Henry P. Talbot, chairman of the Administrative Committee of the Massachusetts Institute of Technology, and professor of chemistry at that institution, spoke recently before the American Chemical Society at Northwestern University on "The Relation of Educational Institutions to the Industries."

The Massachusetts Institute of Technology was one of the pioneers in the effect to increase efficiency and production by bringing about a stronger co-operation between the industries, on one side, and the colleges and universities, on the other.

Dr. Talbot spoke, in part, as follows:—

"Colleges are attacked on the ground of failure to provide their graduates with proper knowledge or appreciation of human relations and the problems of so-called human engineering, and also for their failure to supply men with readily available scientific knowledge, which is the same as the assertion that the training is too academic.

"The systematic efforts so far made in co-operation with the industries have taken the form of such co-operative courses as those in operation at the University of Cincinnati, the University of Pittsburgh, the Massachusetts Institute of Technology, and elsewhere. These courses are serving an admirable purpose and are attaining a high type of engineer. They dispel the too-academic atmosphere of the classroom, they bring the student face to face with application of the principles which he has learned in the classic shades and of the reactions which he has seen in beakers and testtubes, to tons of material and to the control of massive machinery. They also make evident the wide range of knowledge demanded in an engineering profession and they develop an appreciation of the fact that the lecture-room represents an opportunity, not merely a task.

"In spite of free predictions to the contrary these co-operative courses are not a hindrance to the regular production work, and foremen and workmen have uniformly gone out of their way to assist students to get the best out of their work when they recognized they were in earnest. These courses, therefore, go far to afford the best practicable solution of the human engineering difficulty. They do, however, require an extra year, with the attendant expense. The need is therefore urged of additional co-operation from the industries to supply opportunities for summer work for picked men from the junior classes, in the belief that this, although it entails some outlay of time and a little expense, is more of an investment than a philanthropy. The chemical industries, in particular, need to show greater co-operation than heretofore.

"Perhaps, after all, the best solution is an old one, namely, the frank recognition that college graduates must of necessity be immature and that they cannot be endowed with an indefinite list of attributes through the medium of a four-year college course, and a determination on the part of the industries in general to do what some of the larger ones are doing in a formal way, that is, make the college training a foundation on which to build a sort of graduate school. The small concern will do this by adopting a less critical and more sympathetic attitude.

"The chemical industries are in the forefront of those contributing to the endowment of research laboratories; they have also inaugurated plans looking to the endowment of individual persons of distinguished research ability; they have endowed fellowships which are of great value in the promotion of research and as a stimulus to young men. Notable among the fellowships recently founded are those of the du Pont de Nemours Co., the Monsanto Chemical Co., and the Graselli Chemical Co.

"In the field of co-operative commercial research there are such typical undertakings as the pioneer Industrial Fellowships of the Mellon Institute, and the somewhat similar organizations, the Research Laboratory of Applied Chemistry and the Division of Industrial Co-operation and Research, which is organizing the so-called 'Technology Plan' at the Massachusetts Institute of Technology."

Dr. Talbot closed his address with a discussion of the position of the members of our faculties as "residuary legatees" after operating expenses have been paid from the general funds of an institution. He urged greater co-operation on the part of these legatees to secure the improvement of methods and practices now hoary with age.

"The industries are warned," said Dr. Talbot, "that the college product is now put on the market at less than cost and that it is as impossible for the colleges as for the industries to meet the present day demands and to maintain quality without enlarging plant and personal. All of which makes for generous financial assistance and sympathetic co-operation, which in the last analysis, is not so much philanthropy as insurance."

DRUG SUBSTITUTES

Habit-Forming Narcotics May Be Replaced by Newly Found Unharmful Products

Substitutes for habit-forming drugs, such as opium and morphine, have been found, as shown by papers read at the A. C. S. meeting in Chicago before the Division of Pharmaceutical Chemistry of the American Chemical Society, in session at the University of Chicago. The frequent statements which have appeared in the public press to the effect that prohibition has increased the sale of narcotics have stimulated the American chemists to find substances which can be used to soothe pain without fastening a drug habit upon the sufferer.

This constructive effort was evidenced throughout the entire program of the division. One of the substitutes which has attracted most attention is benzyl benzoate, which was first proposed by Dr. David I. Macht of Johns Hopkins University more than a year ago, because of its powers to quiet certain forms of pain.

"This compound," says Dr. Edgar B. Carter, secretary of the division, "is not an ideal one for general use, although it has the power to quiet certain forms of pain. It has several objections, in that it is an oily fluid, insoluble in water, and has a sharp, burning taste."

Dr. H. A. Shonle of Indianapolis, who with Dr. P. Q. Bow is the author of the paper, "New Benzyl Ethers Possessing Anti-Pasmodic Action," reported on some of the compounds which he has obtained from benzyl alcohol by using various organic acids obtained from oils. Dr. E. A. Wildman of Earlham College, Richmond, Ind., and Dr. Mortimer Bye of Detroit described the benzyl derivatives which they had prepared. These are crystalline compounds, some of which can be dissolved in water, and are considered totally free from the objections made to benzoate.

The indications are, judging from the trend of discussion at the meeting of the division, that there will be a wide demand for preparations of this kind, as they offer remarkable powers of relieving pain without exerting any harmful action.

NEW NAPHTHALENE DYES

Colors for Silk and Wool Described at A. C. S. Meeting in Chicago

New napthalene dyes which color silk and wool directly in brown tones ranging from reddish to yellowish were described recently by Dr. A. S. Wheeler, of the University of North Carolina, in an address before the Dye Division of the American Chemical Society, held at the University of Chicago.

"The tones," said he, "vary with the reaction of the bath, and also may be modified considerably by the use of mordants.

"The sulfonation of naphthalene with fuming sulphuric acid," continued Dr. Wheeler, in describing the method of making these colors, "is so regulated that the naphthalene 1.5-disulfonic acid is obtained. This is fused with caustic soda, and the resulting naphthol is oxidized with chromic acid to juglone. This hydroxynaphthoquinone yields a wide variety of halogen derivatives; additional products at low temperatures, and substitution products at high temperature. These are dyes, since they contain both the chromophore and auxuchrome groups.

"Both chlorine and bromine derivatives of juglone have been prepared. Tribromojuglone is obtained in yields of nearly 100 per cent. of the theoretical, is rich red in color, while its sodium salt is indigo blue. The new work in this field includes the preparation of some ethers. Methyl ether, brick-red crystals, its sodium salt being difficult to prepare; ethyl ether, yellowish red needles, its sodium salt being readily made. The influence of the alkyl radicals is to cause the dyes to become reddish in tone."

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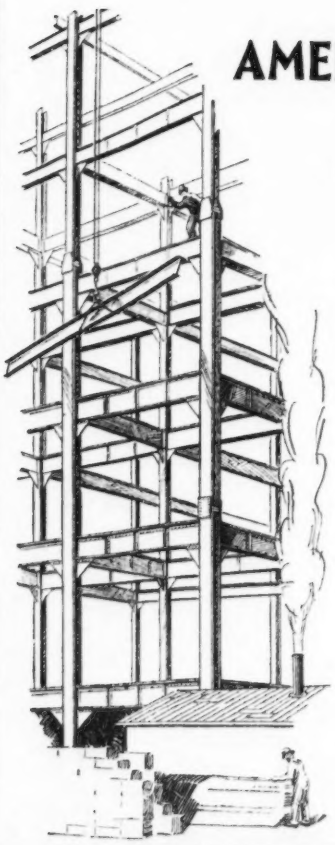

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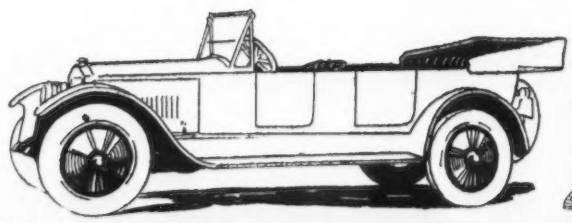
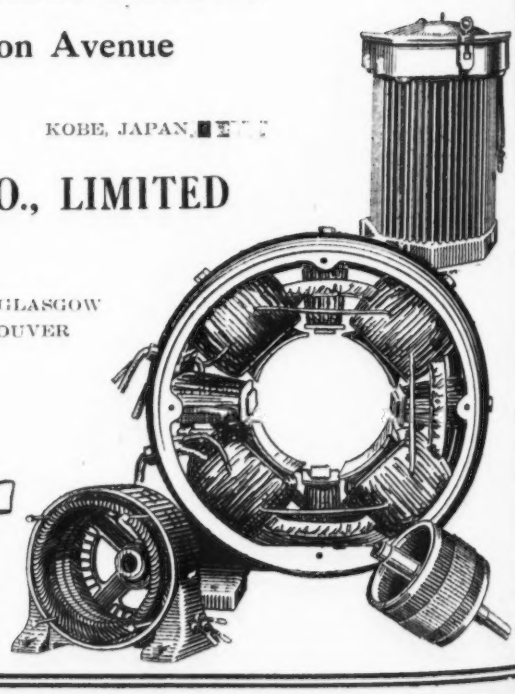




COMPLETE LIST OF EXHIBITORS WITH IDENTITY NUMBER OF BOOTHS.

By Reference to the Diagrams Printed Herewith the Location of Any Exhibit Can Be Found at Once —Key to Main Floor, Mezzanine, Third and Fourth Floor Booths Indicated.

A

Abbe Engineering Co., New York City, Booths 77 and 78

(Main Floor)

will exhibit a representative line of the products which it offers. Particular attention is called to the showing of grinding and pulverizing machines including pebble mills, ball mills, disintergrators, rotary cutters and laboratory jar mills. The display will be in charge of H. F. Kleinfeldt.

Paul O. Abbe, Inc., New York City, Booths 87 and 88

(Main Floor)

expect to have four entirely new types of motor driven mills and several of the booths by Henry Sellam, vice-president of the concern's standard machines, also motor driven. The trade will be met at the booths and consulting engineer, and John Buckley, sales manager.

Ainsworth & Sons, William, Denver, Booth 554

(Third Floor)

have specialized in its line of scales and balances. Prominently displayed is the Precision balance which is sensitive enough to register 1/1000 of a milligram. There is also an Analytical balance with keyboard operated weight carrier and also an Analytical balance with Vernier rider carrier weighing up to 50 milligrams. Robert C. Ainsworth will represent the company.

Ajax Electrothermic Corp., Trenton, N. J., Booths 482 and 483

(Third Floor)

have a non-operating exhibit of a 20-kilowatt Ajax-Northrup high frequence converter system and furnaces for operation from this converter. Also an Ajax-Wyatt Brass Melting furnace. In connection with the exhibition booth of the Foote Mineral Co., booth 66, main floor, the above unit may be seen in operation as well as a standard D-1 model high temperature furnace. The company declares one of its feature displays to be found in the means of changing electric power of standard voltages and frequencies to high frequency power suitable for operating the Ajax-Northrup High Frequency Induction Furnace, standard forms of metal melting, annealing, and heat treating furnaces. The furnaces are suitable for handling nonferrous metals as well as many materials of a refractory nature. The following representatives of the company will be in charge of the exhibits:—Messrs. Clamer, Northrup, Porter and Wilcox.

Ajax Metal Co., Philadelphia, Pa., Booths 482 and 483

(Third Floor)

will present an Ajax-Wyatt Furnace in the form of a non-operating unit. Messrs. Gieseke, Adams, Wyatt and Haig will be found in attendance.

Alberene Stone Co., New York City, Booth 332

(Mezzanine)

has an exhibit which consists of the most recent construction employed in the equipment of the modern industrial and educational laboratory. A feature is made of the fume hood constructed entirely of Alberene stone and wire glass together with ventilation systems. Other fixtures in the exhibit consist of a wall table with reagent shelves, chemical sink with Alberene peg-board, a center table with gutter, sink and reagent shelf illustrating the ready adaptability of Alberene stone to varying conditions. The following representatives of the company will be found at the booth:—E. L. Collins, W. K. Fields, E. G. Grothe, W. Heins, A. Y. Meeker, N. N. Monneypenny, Jr., and W. L. Harrison.

Allen Electrolytic Cell Corp., Portland, Me., Booths 401 and 402

(Third Floor)

will feature an Allen-Moore Cell for electrolytic production of chlorine and caustic soda. The exhibit will be under the direction of Howard D. Marsh and Kent R. Fox.

Allis Chalmers Mfg. Co., New York City, Booth 241

(Mezzanine)

have an operating model of a dust collector and other equipment manufactured by the company's crushing and cement machinery department. The New York office personnel will attend to the interest of visitors at the booth.

American Aniline Products, Inc., New York City, Booths 202, 203, 204

(Mezzanine)

are to display the company's full line of colors dyed on the material which ultimately reaches the consumer. The materials exhibited include felt, leather, wool, cotton and silk. As a by-product of color manufacture, the exhibit will include such products as Thymol, U. S. P., Terpineil, C. P., and Terpene Hydrate, U. S. P. as leaders of a long line of fine chemicals and essential oils. A large staff will represent the company at the exhibit. The representatives designated for this service are:—Messrs. Fenton, Gossen, Roelofs, Mehnen, Bennefield, Giroward, Collins, Chace, O'Hara, Hennessy, Whyte, Greegor, McGermott, Schliecher and Chessman.

American Chemical & Manufacturing Corporation, Norfolk, Va., Booths 319 and 320

(Mezzanine)

Shows in its chemical division cobalt resinate precipitate, manganese resinate precipitate, anhydrous linoleates, cobalt linoleates, manganese linoleates and oleates. There are shown all sorts of materials, rust-proofed, water-proofed, acid-proofed and protected in other ways by the products of the company. Members of the corporation and staff are present to explain the exhibit.

American Chemical & Sugar Machinery Co., Philadelphia, Booths 210 and 210a

(Mezzanine)

present a showing of the Hird Patent Continuous Oil and Tar Plant, Patent Film Evaporator, Patent Centrifugal Scrubber, Sugar Machinery and photographs of general chemical equipment. Messrs. J. C. Lawrence, B. Dunglinson and R. C. Comley will receive visitors at the booths on behalf of the company.

American Cyanamid Co., New York City, Booth 90

(Main Floor)

are to present in an illuminated wall case the cyanamid process of fixing air nitrogen. By means of miniature models of the principal apparatus used, raw materials, intermediate products and finished goods, an interesting display has been gathered. In charge of the presentation will be E. J. Pranke, R. R. Stewart and J. P. Hubbell

American Dresssler Tunnel Kilns, New York City, Booth 660

(Fourth Floor)

Illuminated screen shown continuous view of tunnel kilns and their application to chemical processes; samples of materials such as bricks, porcelain, steel, and malleable iron which have been treated in tunnel kilns. In charge of exhibit:—Conrad Dressler.

American Dressler Tunnel Kilns, Inc., Booth 660

(Fourth Floor)

Shows an illuminated screen with pictures of the company's kilns, also specimens of goods put through the kilns. The exhibit is in charge of Conrad Dressler.

American Kron Scale Co., New York City, Booth 438

(Third Floor)

present a wide and comprehensive display of modern automatic scales for all commercial and scientific purposes. The company is represented by J. J. Kelly and J. Hellstrom.

American Metal Co., Ltd., New York City, Booths 279 and 280

(Mezzanine)

have an extensive and complete exhibit of the materials mined and produced by the company and its subsidiaries. It includes zinc ores, spelter, zinc oxide, zinc dust, zinc sulphate, lead bullion, lead ore, refined lead, litharge, coal and copper ores.

American Pulverizer Co., St. Louis, Mo. Booth 740

(Fourth Floor)

American Pulverizers suitable for the chemical industry. In charge of exhibit:—Dunning, Luckel Engineering Co.

American Steel & Wire Co., New York City, Booth 715

(Fourth Floor)

Sulphate of iron, both sugar and crystal form; different materials made from sulphate of iron or in which this plays an important part in manufacture. In charge of exhibit:—Arthur S. Lutz.

American Water Softener Co., Philadelphia, Pa., Booth 420

(Third Floor)

have a feature display of Decalso Compensating Ziolitic Water softeners, filters and lime soda water softeners. W. P. Runcie, G. M. Graybill and R. W. Conrad will receive visitors to the exhibit

Anaconda Copper Mining Co., New York City, Booth 6

(Main Floor)

will illustrate the various steps in the metallurgy of copper from the ore to the finished products will be shown. Exhibits of Anaconda electrolytic zinc and lead from the International Lead Refining Co. will also be presented. A special feature is being made of Anaconda white lead. By means of comparative panels, the extreme whiteness of the white lead is shown. The product is the result of years of experimentation and practical application in try-out work by the research staff of the Anaconda Lead Products Co. S. Skowronski will be in charge of the presentation.

Angel & Co., Inc., H. Reeve, New York City, Booths 273 and 274

(Mezzanine)

are to bring together an extensive showing of filter papers and filtering materials in general with an exhibit of Labruco rubber tubing. B. S. Proper, assisted by T. L. Harrocks, will have charge of the booths.

Aniline Dyes & Chemicals, Inc., New York City, Booths 301-304

(Mezzanine)

exhibits an attractive display of woven and printed fabrics in wool, silk and cotton which show the results of using the firms products. A feature is made of these materials. A large representation of the company will be on hand at the booths, W. H. Fieldhouse, W. Mitchell and C. A. Mace from the New York office; J. B. Jones, Chicago; F. C. Wittig, Boston, and R. Ely, Philadelphia, will be at the service of visitors.

Aniline Sales Corp. New York City, Booths 758 and 759

(Fourth Floor)

present a representative line of direct cotton and wool dyeings as well as fast colors on wool and vat dyeings. Samples of interest to the hosiery trade and the silk and leather industries together with a line of oil colors for the paint and wood trades will also be found. As a feature of the exhibit, a prominent display is made of fancy bright colors for the manufacture of shoddy and reworked wool; union dyeings for mixed cotton and wool and heather effects on knit goods. In order to serve visitors to the booths, the company has called on the New York, Chicago and Southern offices for assistance. A. L. Mullaly, Wm. G. Horgan, Henry Metz, Edward B. Gross and Arthur H. Frank of the New York office will be in charge.

Anti-Hydro Waterproofing Co., New York City, Booths 267 and 268

(Mezzanine)

will show an interesting material—Anti-Hydro—to be used in waterproofing, hardening, oil proofing concrete and making the same resistant to acids and all chemicals. The feature exhibit will be concrete storage tanks for fuel oil, tanning liquor; sulphuric, nitric, acetic and other acids; brines and soap solutions. B. A. Meyer, treasurer of the company, will be assisted by Thomas Moore, export manager; Joseph Meyer, Philadelphia; M. R. Duffy, Chicago representative; M. E. Townsend, New England representative, and Charles A. Brown, New Jersey, at the booths.

Apex Chemical Co., New York City, Booth 287

(Mezzanine))

present a wide range of products which include:—Antimony sulphurettes, crimson and yellow, antimonelle (a displacer of tartar emetic), and other antimony compounds; sulphoneted oils; softeners and finishing compounds for the textile trade, and a line of interesting finishes and specialties for the leather industry. Especial emphasis will be placed on a display of various kinds of fabrics and leather treated with the specialities of the company. The exhibit will be under the direction of S. M. Herman, Hugo Helburn, Charles B. Rasenberger and H. Nelson Craig, who will be on hand at the booth.

Arkell Safety Bag Co., New York City, Booth 510

(Third Floor)

have an ample display of the company's line of paper linings. A feature of the exhibit is "Arksafe" elastic paper linings for shipping barrels. P. J. Morales will be in charge of the display.

Arnold Hoffman & Co., New York City, Booth 246 and 247

(Mezzanine)

offer a most complete display of oils, softeners, gums, starches, dextrines, pigment colors and special products for use in the textile, paper, chemical, leather and other industries. Nearly all of the materials exhibited are manufactured at the Anchor Color and Gum Works, Dighton, Mass., a subsidiary of the company.

Armstrong Cork Co., Pittsburgh, Booth 612

(Fourth Floor)

have one of the most interesting and attractive exhibits in the exposition. As a special feature, an electrically heated furnace in full operation in order to show the heat saving qualities of Nonpariel Insulating Brick. In addition to this, a general line of insulating materials is presented. A corps of prominent officials of the company will be found at the booth.

Aterite Company, Inc., New York City, Booth 494

(Third Floor)

have drawn together for display purposes a complete line of the company's iron body. Aterite trimmed valves and cocks; also valves, cocks, fittings and specialties constructed entirely from Aterite.

The iron body valves trimmed with Aterite are particularly adapted for handling petroleum and the lighter distillates of the same. Other valves, cocks and fittings presented are used for high temperature, high pressure, oil stills and sulphuric-acid lines. For conditions requiring great strength and non-corrosive properties, the company offers a display of wrought Aterite in the shape of rods, sheets, wire, etc. Ernest G. Jarvis will be found in charge of the booth.

Atlantic Dyestuff Co., Boston, Booth 613

(Fourth Floor)

has brought together a comprehensive display of the products of the company. It includes:—A complete miniature azo dye-making plant, which will be operated at given periods. In addition, the Atlantic will display samples of its various intermediates and dyestuffs, as well as dyed fabrics illustrating its colors. Those in attendance from time to time at the Atlantic company's exhibit will include A. C. Burrage, Jr., Chas. H. Stone, G. R. Stoettner, Dr. H. M. Paine, C. C. Burt, H. R. Ulirich and Karl Ruger.

Atlas Electric Devices Co., Chicago, Ill., Booth 414

(Third Floor)

shows methods of color testing by means of a more rapid and accurate process than sunlight. This is done by means of the Color Fade-Ometer. The following tests are in progress throughout the exposition:—Fading of woolens, silks, cottons, prints, carpets, velvets, plushes, upholstering, paper, leather, paints, varnishes and inks. Clarence W. Jameson, president, and Hugh E. Weightman, director of the research division of the company, are in charge.

B

B. T. Babbitt, New York City. Booth 737

(Fourth Floor)

The company is displaying a full line of their soap products in addition to the usual exhibit of caustic soda and bleaching powder. The feature of the Babbitt display is the exceptionally strong metal container used by them in making soda shipments. These containers are made in all sizes to supply the demand for small packages. R. V. Puff and E. Congleton are handling the display for the company.

Bacharach Industrial Instrument Co., Pittsburgh, Pa. Booth 610

(Main Floor)

Pressure recorders and gas meters in actual operation; special demonstration showing the application of Pitot tube to the measurement of gases. In charge of exhibit:—Herman H. Sticht, Mr. Lauterbach, and Mr. Bacharach.

Bachmeier & Co., New York City, Booths 336 and 337

Mezzanine)

exhibits aniline dyes. This exhibit shows mill dyeing of textile products, sample dyeings and dyes. G. M. Lord, William Baur, H. Gettler, C. Lant and other members of the staff and sales force are in attendance at the booths.

Bailey Meter Co., Cleveland. Booths 559 and 561

(Third Floor)

exhibits a complete line of Bailey boiler meters for recording steam flow, air flow, flue gas temperature and other important factors for boiler operations. There is a working exhibit showing water flowing at the rate of 60,000 pounds per hour through both V-notch and orifice meters, one checking the other; also an orifice meter measuring low pressure air flowing through a six-inch pipe. Another exhibit is an orifice meter placed between two sections of four-inch glass pipe with water flowing through it showing the stream lines and vena contracta, and another a series of water columns connected to each side of another orifice in iron pipe gives a visual demonstration of the fundamental principals of the orifice. The booths are in charge of E. G. Bailey, W. R. Little, H. M. Hammond, N. Dmytrow, Jr., and M. Repa.

Baker Sons & Perkins Co., Joseph, Inc., Booth 63

(Main Floor)

Shows mixing machines. There is a set of laboratory size mixers in operation, and a number of special features. The booth is in charge of A. J. Vollrath, J. C. Caley, S. D. Gridley and E. Zigler.

Barber Asphalt Paving Co., Philadelphia. Booth 82

(Main Floor)

shows crude and refined Trinidad Lake asphalt and finished products using these materials. F. F. Massey, E. R. Christhilf, C. A. Conner, J. S. Maynar, L. S. Greenwood, Theodore T. Thomas, T. A. Topping, J. S. Miller, C. N. Forrest, Arthur T. Cavey and F. J. O'Neill are attending the exposition as representatives of this company.

Barrett Co., The, New York City. Booths 18 and 19

(Main Floor)

exhibits the principal products of the Chemical Department of the Barrett Co., together with specialties originating in other departments of the company and of interest to the chemical industry, also new developments coming from the Research Department. The exhibit is in connection with a joint exhibition in which the National Aniline & Chemical Company, the General Chemical Company, the Semet-Solvay Co., and the Solvay Process Co. will take part. The entire Fourty-seventh

CHAS. PFIZER & CO.

INCORPORATED

ESTABLISHED 1849

Manufacturing Chemists

NEW YORK

Citric Acid Crystals, Granulated and Powdered	99½-100 per cent.
Tartaric Acid Crystals, Granulated and Powdered	" " " "
Cream Tartar Powdered and Crystals	" " " "
Rochelle Salt Powdered and Crystals	" " " "
Borax Crystals, Granulated and Powdered	" " " "
Boric Acid Crystals, Granulated and Powdered	" " " "

Camphor Refined	Calomel
Bismuth Subnitrate	Corrosive Sublimate
Minor Bismuth Preparations	Red Precipitate
Seidlitz Mixture	White Precipitate
Potassium Iodide, Crystals and Granulated	Strychnine
Iodoform	Iron and Ammon. Cit., U. S. P.
Iodine Resublimed	Iron and Ammon. Cit., Green Scales
Chloroform	Other Scale Salts of Iron
Potassium Citrate	Ferric Ammonium Oxalate
Sodium Citrate	Ferric Potassium Oxalate
Tartar Emetic	Ferric Sodium Oxalate
Tannin	Ferric Oxalate Scales

Also a general line of Chemicals for Medicinal, Photographic, Blue Print and various Technical Purposes

street side of the main floor is jointly decorated by these five companies, the exhibits of the companies being placed in such a way as to show the particular relation of the products of these companies to the development of the dyestuff, pharmaceutical and other synthetic chemical industries. H. G. Sidebottom is in charge of the exhibit. He has numerous assistants.

Bausch & Lomb Optical Co., Rochester, N. Y. Booths 306 and 307

(Mezzanine)

This company is showing a wide line of optical instruments, incuding microscopes, refractometers, colorimeters and metallographic apparatus. The feature of the exhibit is the line of optical measuring instruments. Wm. L. Patterson and E. H. Anthes are in charge of the exhibit.

Beach Russ Company, New York City. Booths 77 and 78

(Main Floor)

The display consists of a line of high vacuum pumps, pressure blowers, acid and liquid pumps, centrifugal pumps, furnaces, pulverizing machinery and bench forges. The display is featured by the high vacuum pump operation and by the pulverizing machinery which is also displayed in operation. A. T. Beach, H. C. Russ and C. A. Beach are handling the exhibit.

Beaver Chemical Co., Damascus, Va. Booths 732 and 733

(Fourth Floor)

This company is displaying its line of dyestuffs together with samples of materials on which the dyestuffs have been applied. John L. Crist and Glen M. Smyth are in charge of the exhibit.

Becker, Christian, Inc., New York City. Booths 537 and 538

(Third Floor)

shows analytical, chainomatic, specific gravity and chainomatic jewelers' balances, laboratory, textile, cream test, seed and grain test and prescription scales and weights. The representatives of the firm at the exposition are:—A. T. Millroy, J. W. Wetz, W. L. Ferdon, S. W. Hess and D. Taylor.

Beckley Perforating Co., Garwood, N. J. Booth 506

(Third Floor)

shows samples of perforated steel, brass copper, aluminum and tin; electrically welded steel tanks and shapes such as are used by the chemical industries. The firm is represented by T. H. Harvey, T. P. Carlson and A. L. Price.

Bethlehem Foundry & Machine Co., South Bethlehem, Pa., Booth 13

(Main Floor)

shows a line of castings made of corrosiron and makes an acid test showing the comparative corrosive effect of nitric acid upon ordinary gray iron castings as against corrosiron castings. The representatives of the company in attendance at the exposition are:—J. George Lehman, vice-president and general manager; R. E. Wilbur, vice-president; George Ettele, Jr., chemist; A. H. Stevens and R. H. Stevens, engineers.

Blackmer Rotary Pump Co., Petosky, Mich., Booth 444

(Third Floor)

This well arranged display of chemical machinery shows a full line of pumps and electric units, most of which are displayed in actual operation. Many of the machines which are displayed were built expressly for the exposition. Pumps with removable cylinder linings, sanitary pumps for handling all kinds of fluids, rotary pumps equipped with by-pass, pressure relief valve and air chamber are also displayed. A. L. Rock and F. P. Goertz are handling the display for the company.

P. Blakiston's Son & Co., Philadelphia. Booth 408

(Third Floor)

This company is displaying a line of scientific books, among them several new and important works on chemistry, including Sutton's "Volumetric Analysis" and Fitz-David's "Chemistry of the Dye Industry." Walter B. Hilt is handling the display for the company. Horace G. White is also in attendance.

Booth Electric Furnace Co., Chicago, Ill., Booths 462 and 463

(Third Floor)

shows a rotating electric furnace, 500-pound size. E. F. Tweedy and F. W. Doran represent the company.

Boyer Oil Co., New York City, Booth 738

(Fourth Floor)

This company is displaying all seed and nut oils in the raw, refined and processed states. A line of raw materials for the production of these oils as well as a line of the by-products secured in their refining are also shown. The booth is in charge of J. R. C. Boyer and Chas. E. Kienle, Jr.

Bragdon, Lord & Nagle Co., New York City, Booth 511

(Third Floor)

This company is showing its line of publications for the chemical and allied trades. They comprise "The Textile World Journal," "The Official American Textile Directory," "Textile Brands and Trademarks," "American Directory of the Knitting Trade," and a line of technical books. The booth is in charge of R. T. O'Connell. He is assisted by practically the entire staff of the company at various times during the show.

Bristol Co., The, Waterbury, Conn., Booth 84

(Main Floor)

show recording instruments for pressure, vacuum, temperature, electricity, speed, etc. H. L. Griggs is in charge of the exhibit.

Brown Instrument Co., Philadelphia, Booth 41

(Main Floor)

This exhibit consists of a complete and comprehensive display of high and low temperature measuring devices including indicating and recording pyrometers, recording thermometers, resistance thermometers, indicating and recording instruments for pressure, vacuum, speed, time and operation. The booth is in charge of J. P. Goheen, secretary, and G. W. Keller, sales manager. Assisting them are J. D. Andrews, New York district representative; M. A. Leister, advertising manager; George W. Goodman, R. B. McCafferty, C. D. Porterfield and O. W. Stowe.

Brown Portable Conveying Machinery Co., Chicago, Booths 685, 692

(Fourth Floor)

Exhibit consists of inclined and vertical elevators for package goods and a wagon belt loader for loose materials These machines save time, labor and money in handling materials, the company's data show. They represent several of a series of handling machinery manufactured by the company. The representative at the booth is O. H. Oertel.

Buckman & Pritchard, New York City, Booth 253

(Mezzanine)

This company is showing a line of crucibles from the smallest to size 200, muffles of various sizes, spark plug porcelains, electrical porcelains, linings for combustion chambers of gas engines, manufactured from Zirconium silicate. Samples of various minerals including Ilemenite from which a new white pigment is being produced. Rutile from which are made electrodes, pigments and dyes and other new minerals. The features of the exhibit are refractories made from zirconium silicate and porcelains produced from the same material. G. A. Pritchard and H. H. Buckman, vice-presidents of the company, are in charge of the display.

Buffalo Foundry & Machine Co., Buffalo, N. Y., Booths 23, 24, 25, 26, 27

(Main Floor)

displays a large line of vacuum drying apparatus, evaporators, chemical equipment and sugar apparatus. Apparatus and full information are available pertaining to new developments in the lines of machinery handled by the company which have reached their fulfillment during the past year. E. G. Rippel, sales manager, is in charge, assisted by a corps of engineers and other representatives.

Burrell Technical Supply Co., Pittsburg, Pa., Booth 675

(Fourth Floor)

exhibits gas analysis apparatus and laboratory supplies and equipment. H. J. Segrave R. P. Mase and G. H. Bunell represent the company.

C

Calco Chemical Co., Bound Brook, N. J., Booth 70

(Main Floor)

This display consists of a showing of all of the dyes and intermediates produced by the company, together with demonstrations of dyeings on all fabrics, paper pulps and lakes. The feature of the display is a showing of various new uses for dyes which have been developed in the laboratories of the company. Messrs. Sampson, Sumner, Klein, Bosworth, Ackerman, Paradise and Merry are handling the display.

Canada Carbide Co., Ltd., Montreal, Can., Booths 471 and 472

(Third Floor)

This company is showing its calcium carbide in various packings for both the export and domestic trade. The display is featured by the showing of colored slides of the works and industrial developments of the company, together with motion pictures of the Shawinigan plants of the company. H. E. Mussett, sales manager, and Henry Booth the New York sales manager, are handling the display.

Canadian Chemical Journal, Toronto, Ont., Canada, Booth 488

(Third Floor)

The booth has been placed at the disposal of visitors from Canada and all those interested in Canadian chemical developments. L. E. Westman is in charge.

Canadian Electric Products Co., Ltd., Montreal, Canada. Booths 471 and 472

(Third Floor)

This company is showing its line of chemicals, including acetic acid, acetaldehyde, paraldehyde and aldehyde ammonia. The exhibit is featured by the display of lantern slides showing views of the various industries at Shawinigan Falls. H. E. Mussett, of Montreal, and J. C. Freut and H. E. Booth, of New York, are handling the display.

Canadian-Pacific Railroad, Booths 489 and 490

(Third Floor)

Shows a large illuminated map showing Canada's natural resources; also miners from different parts of Canada. The booth is in charge of E. R. Bruce, G. G. Ommanney and Norman S. Rankin.

Carborundum Co., Niagara Falls, N. Y., Booth 56

(Main Floor)

exhibits crude carborundum crystals and crude aloxite crystals as taken from the electric furnace, silicon metal carborundum and aloxite abrasive products, including grains, paper and cloth wheels, carborundum refractory brick and special shapes, made in Carbofrax "A," "B" and "C" grades, and Refrax, Silfrax pyrometer protection tubes and muffles. Representatives are Otis Hutchins, Dr. M. L. Hartman, S. C. Linbarger, C. E. Hawke and W. L. Meek.

Carrier Engineering Co., New York City, Booths 1 and 2

(Main Floor)

This display consists of Carrier air conditioning apparatus showing that weather can indeed be manufactured It illustrates the principles of humidifying, dehumidifying, heating, cooling, purifying and drying. The latest types of high temperature drying and baking apparatus are also shown. The features of the display are a complete working installation of Carrier air conditioning equipment and a model Harrison Aertude Heater, delivering air at 400 degrees F., for the drying of paints, varnishes and the baking of enamels, insulation compounds and japans. J. E. Bolling and R. C. Borden are in charge of this exhibit.

Celite Products Co., New York City, Booth 14

(Main Floor)

Will exhibit Sil-O-Cel insulating products, Celite high temperature cement, Celcote for waterproofing insulation. Celite as a filler for paints, also Filter-Cel for the filtration of fruit juices, chemicals, dyestuffs, cereal beverages, etc. To demonstrate the effectiveness of Sil-O-Cel insulating products, a miniature furnace will be in constant operation. This furnace will be built up of Sil-O-Cel brick and have one side constructed of standard fire brick. It will be equipped with thermometers which will show the temperature difference between the Sil-O-Cel walls and the fire brick wall, or, in other words, the insulated and uninsulated wall. A small demonstration filter press will be in operation to demonstrate the method of using Filter-Cel and the results derived by its use. The following will be in attendance at our booth at various times:—L. S. Abbott, T. G. Lee, W. L. Jordan, A. S. Elsenbast, H. N. Haberstroh, P. C. Durbin, A. H. Fertig, E. F. Davis, C. J. Parsons, E. A. Phoenix, C. J. Peterson, V. A. Lambiase, G. M. Hickey, T. E. Ventriss, K. A. Grogan, S. B. Martin.

Celluloid Zapon Co., New York City, Booth 12

(Main Floor)

An attractive exhibit showing various products of metal and wood and composition finished with transparent lacquer and colored lacquer enamels. The exhibit also shows samples of the company's products, comprising lacquers of various types, enamels and bronzing liquids. The exhibit is in charge of B. O. Clausen, Charles Schriegel, George Begam, C. G. Piske and Thomas Brown.

Central Scientific Co., Chicago, Booths 496, 497 and 498

(Third Floor)

This company is showing a complete line of chemical apparatus in operation. Following is a list of the Cenco Specialties which are displayed:—Constant temperature appliances, consisting of electrically heated and controlled drying ovens, vacuum ovens and water baths high vacuum pumps, fuel testing equipment, electric furnaces, electric-titration apparatus, oil testing equipment, electrically operated laboratory devices, rheostats, motor stirrers, flask heaters physico-chemical apparatus, including surface tension apparatus, molecular weight determination apparatus, etc. S. L. Redman, C. T. Louis and A. B. Carter will have charge of the display.

Chapman Engineering Corp., Mt. Vernon, Ohio, Booth 74

(Main Floor)

This display is featured by a full sized Chapman automatic feed floating agitator in actual operation. Regulating and recording devices and a six-foot model of the Stein furnace are also shown. W. B. Chapman and J. M. Capron are in charge of the display.

Chemical Age, New York City, Booth 495

(Third Floor)

This company is offering its publication, "The Chemical Age," a consolidation of the "Chemical Engineer" and the "Chemical Age." The publication is represented by Lloyd Lamborn, editor; C. W. Butterworth and A. J. Mordaunt.

Chemical Catalog Co., Inc., New York City, Booth 29

(Main Floor)

This company is showing its line of publications relating to the chemical industries. The exhibit is featured by the 1920 edition of the "Chemical Engineering Catalog," "The Condensed Chemical Dictionary" and "Modern Pulp and Paper Making," three of the latest publications of the company. The publications of the American Chemical Society are also shown. F. W. Robinson, Edward G. Nellis, Francis P. Turner, Jr., John Hilprich, D. D. Borotzheimer, H. L. Powell and L. R. Hudson are in charge of the booth.

Chemical, Color and Oil Daily, New York, Booth 443

(Third Floor)

Copies of the publication containing accounts of the convention are distributed from this booth which is in charge of W. E. Tufts, S. W. Dean, James S. Guerin, Walter Vogel, A. Barchi, W. Stryker, W. J. Ostermeyer and E. Sartori.

Chemical Co. of America, New York City, Booths 281 and 282

(Mezzanine)

Exhibit consists of a number of intermediates and a fairly complete line of colors manufactured at the company's works in Springfield, N. J. The acid colors are displayed under the name of "Chemco" and the direct colors under the name of "Diamid," both of which are registered names. A special feature of the exhibit is the display of cloth and silk wherein Chemco and Diamid colors have been used. Those in charge of the exhibit are C. H. Kendall, A. P. Christ, R. A. Steele, F. X. Lehmann, John Graham and F. C. Telen.

Chemical Equipment Co., Chicago, Booth 517

(Third Floor)

The display of this company consists of "Ceco" acid resistant valves and pumps, a priming system for use in connection with pump drawing liquor from below its own level, a spray system which uses no nozzles and an experimental size evaporator. All of this apparatus with the exception of the evaporator is set up as a working exhibit arranged to demonstrate the merits of the "Ceco" equipment. H. E. LaBour, R. T. White, F. L. Dunlap and E. M. Baker are in charge of the exhibit.

Chemical Pump & Valve Co., Perth Amboy, N. J., Booth 505

(Third Floor)

This exhibit comprises a full line of packingless valves, centrifugal pumps and an assortment of other equipment and fittings for chemical works. The feature of the display is the packingless centrifugal pump which is shown in actual operation. The display is handled by F. A. Warter, manager, and A. B. Antisell, treasurer of the company.

Antoine Chiris & Co., Delaware, N. J., Booths 308, 309, 310 and 311

(Third Floor)

The attractive exhibit of this concern shows a full line of essential oils, synthetic aromatic chemicals, resinaromes, oleo resins and other products which are manufactured in the American factories of the company. The feature of the display is a wall map showing the place of origin of an exhibit of raw material which are used in the finished products offered by the company. The company is also showing the "Capes-Viscose" self fitting bottle cap. Members of the sales department of the company have charge of the exhibit.

Cleveland-Cliffs Iron Co., Cleveland, Booths 256 and 257

(Mezzanine)

The display of this company comprises a showing of samples of the full line of chemicals produced by the company, consisting of alcohols of various types, acetones, sulphuric acid, hexamethylenetetramine, formaldehyde, wood creosotes and several types of special solvents. The company features the display with a line of samples of the materials produced from these chemicals, each sample being labeled with the name of the manufacturer. Chas. B. Hall, sales manager of the company, is in charge of the exhibit. He is assisted by Austin Farrell, manager of the Marquette, Mich., works and E. J. Hudson, the company's general superintendent at the same plant.

Cleveland Instrument Co., Cleveland, Ohio. Booth 610

(Fourth Floor)

Thermo-electric and resistance types of indicating and recording pyrometers; multiple station circular chart recorder. In charge of exhibit:—Herman H. Sticht, W. B. North and H. B. Rich.

Clinchfield Products Corp., New York City, Booth 291

(Mezzanine)

This company is showing a display consisting of potash and soda feldspar in both the crude and ground state. It is also showing a complete line of the products into which these materials enter, including enamel ware, glass, china, porcelain, insulators and the like. Charles Ingram and Leo. L. Hunt are handling the display.

Clipper Belt Lacer Co., Grand Rapids, Mich., Booth 425

(Third Floor)

Shows three different types of "Clipper" belt lacing machines and all sizes of Clipper" carded hooks, together with "Fibro" and rawhide pins. Demonstrations will be made of the rapidity with which all kinds of belting may be laced by the "Clipper" method. William F. Kall, factory representative, is in charge.

Combustion, New York City, Booth 700

(Fourth Floor)

This company is displaying its publication, "Combustion." The display is in charge of R. C. Beadle, managing editor; H. S. Acheson, H. M. Allyn and others.

Commercial Solvents Corp., New York City, Booth 317

(Mezzanine)

This company is showing its line of solvents comprising acetone, butyl alcohol and denatured ethyl alcohol. The display featured by the showing of the Weizman Fermentation Process. Horace E. Hall, sales manager; Charles L. Gabriel, technical adviser, and T. F. Carty, manager of the New York office, are handling the exhibit for the company.

The Container Club, Chicago, Booths 719 and 720

(Fourth Floor)

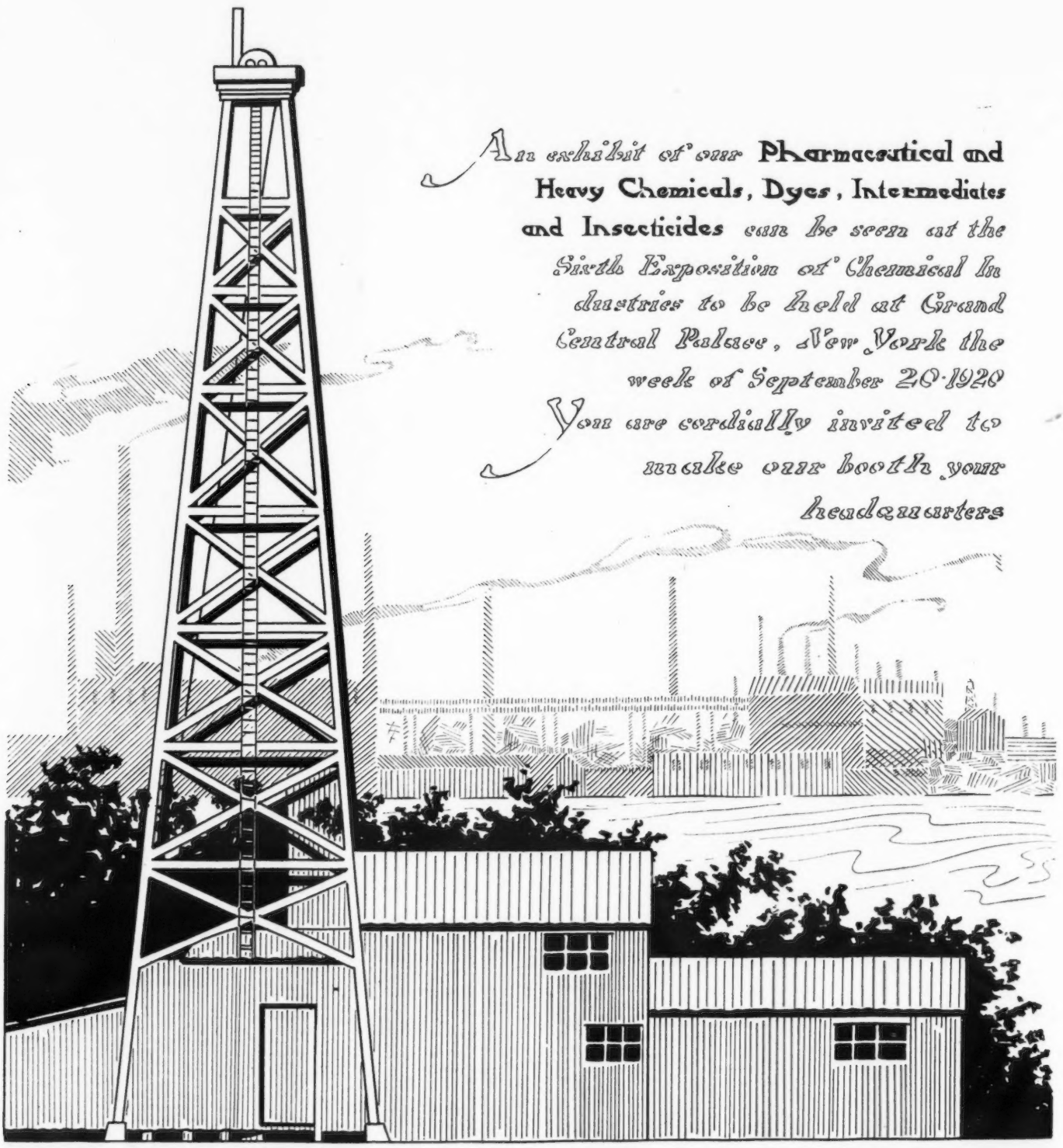
This company is showing a line of corrugated and solid fibre shipping boxes and methods of packing and sealing them. The display is featured by the line of boxes and sealing devices together with machines in actual operation. The booths are in charge of G. R. Browder, W. S. Salt, J. W. Webb and J. D. Malcolmson.

Contact Process Co., Buffalo, Booth 432

(Third Floor)

The display consists of a full line of samples of mineral acids and salt cake which are made in the plants of the company. Truman Smith and Dr. H. von Rucker are in charge of the booth.

Dow Chemicals



An exhibit of our **Pharmaceutical and Heavy Chemicals, Dyes, Intermediates and Insecticides** *can be seen at the Sixth Exposition of Chemical Industries to be held at Grand Central Palace, New York the week of September 20·1920*

You are cordially invited to make our booth your headquarters

The DOW CHEMICAL COMPANY

Midland, Michigan · 90 West Street, New York City

Corning Glass Works, New York City, Booths 338, 339, 340 and 341

(Mezzanine)

This company is displaying a line of its Pyrex glassware suitable for use in the chemical industry. The exhibit is featured by a working exhibit calculated to display the advantages of Pyrex glassware over other containers for laboratory and industrial purposes. Pyrex beakers and flasks are shown in actual use under high temperatures. G. W. Drake, F. F. Pfeiffer, J. B. Cary, Frederick Kraisel and A. S. Eggleton are handling the exhibit for the company.

Crane Packing Co., Chicago, Ill., Booth 536

(Third Floor)

Full line of "John Crane" Flexible Metallic packings for liquid, vapor and acid service. Demonstration of electrolytic disintegration of tubes and pipes, with methods of packing to avoid this destruction. In charge of exhibit:—Julian N. Walton and F. E. Payne.

Crescent Sales & Engineering Co., New York City, Booth 684

(Fourth Floor)

The display of this company consists of Crescent "Roto-Piston" vacuum and pressure pumps, Crescent vacuum chucks and other vacuum equipment. L. L. Beeken, president and general manager, and John Kyte, New York representative, are handling the display for the company.

D

M. T. Davidson Co., New York City, Booth 682

(Fourth Floor)

This company is showing its line of steam pumps comprising various sizes and types. The display is in charge of John Lowe and Wm. E. Brennan.

Davison Chemical Co., Baltimore, Md. Booths 637 and 638

(Fourth Floor)

The display of this concern comprises samples of pyrites ore, cinders, sinter, copper precipitate, sulphuric acid, acid phosphate, double superphosphate, magnesium fluosilicate, precipitated silica and many others. The company features its display with a showing of Silica Gel illustrating its absorbent qualities for vapors and recovery of vapors and reactivation of the Silica Gel for furtner use. E. B. Miller, vice-president in charge of operations, is handling the display. He is assisted by Dr. Benjamin F. Lovelace, Dr. Walter A. Patrick, W. D. Huntington, vice-president in charge of sales, and J. R. Wilson.

De Laval Separator Co., New York City. Booths 531, 532, 533

(Third Floor)

This company is showing a full line of De Laval centrifugal apparatus. The display is featured by multiple clarifiers for the clarification of varnish and pigment goods; centrifugals for the separation of various liquids and centrifugal filters for filtering pharmaceuticals and similar products.

Department of Mines, Province of Ontario, Canada. Booths 491 and 492

(Third Floor)

The bureau is displaying a full line of the mineral and metallurgical products of the Province of Ontario. All of the economic minerals are shown as well as the various products derived from these minerals. The bureau is also planning Motion Pictures in the Lecture Hall showing silver mining in Canada and also gold mining methods in the Province. W. K. McNeill, Provincial assayer, and W. R. Rogers, Topographer and Statistician of the bureau, are in charge of the display.

Detroit Electric Furnace Co., Detroit. Booths 468, 469 and 470

(Third Floor)

This company is displaying a series of "Detroit" installations showing the various types of machines produced by the company. Samples of the metals from which Detroit castings are made and are also displayed. A line of wattmeters and automatic control switches is also shown. Ed. L. Crosby, H. M. St. John, E. L. Kavanaugh and A. E. Rhoads are handling the display for the company.

Detroit Range, Boiler and Steel Barrel Co., Detroit. Booth No. 81

(Main Floor)

This display, which is being handled by W. B. Goddard, C. C. Choate and H. R. Mack, comprises the full line of "Perfect" metal bilge barrels and "Detroit" drums. The display is featured by the bilge barrel display which shows types with both removable and closed heads, agitator equipment and other interesting apparatus.

Diamond State Fibre Co., Bridgeport, Pa., Booths 624 and 625

(Fourth Floor)

This company is showing a full line of its fibre sheets, rods and tubes of all sizes as well as various specialties manufactured from fibre. Receptacles, waterproof insulation, condensite celeron and other products of the company are shown. The display is in charge of Charles M. Bogert, New York district manager of the company. He is assisted by his staff and several engineers from the mill organization.

The J. P. Devine Co., Buffalo. Booth 15

(Main Floor)

This company is showing vacuum drum dryers, chamber dryers, vacuum pumps, KEK Mill and several pieces of unfinished apparatus in process of construction. The booth is attractively decorated and materials are arranged so as to give the best possible effect. The company is represented by J. P. Devine, president; C. P. Devine, vice-president; L. W. Graves, sales manager; George Galloway, chemical engineer, and H. C. Mills, advertising manager.

Dings Magnetic Separator Co., Milwaukee. Booths 548 and 549

(Third Floor)

The display consists of a type M magnetic separator, magnetic pulley types separator, high intensity magnetic separator. The display is featured by the offer of the company to crush and separate samples for any interested in the machinery. J. R. Munegold, E. S. Hirschberg, A. H. Ackerman, E. F. Oakes, J. E. Randall are handling the exhibit for the company.

Dow Chemical Co., Midland, Mich. Booth 79

(Main Floor)

This company is displaying a full line of the chemicals manufactured by the Dow plants, including various new chemicals and pharmaceuticals, dyes, intermediates, and insecticides. The exhibit is in charge of G. L. Camp, Geo. Ashworth, W. I. Doan, R. E. Dorland, M. Y. Seaton and L. I. Doan.

Dominion Water Power Branch, Ottawa, Ont., Canada. Booth 473

(Third Floor)

The booth is set aside as an information bureau in regard to Canadian water power, forest and mineral resources. Representatives in attendance are from the Dominion Water Branch, Department of the Interior; Forestry Branch, Department of the Interior, and Mines Branch, Department of Mines.

Dorr Co., The, New York City. Booths 51, 52

(Main Floor)

Working installation of Dorr agitator, tray thickener and pump demonstrating methods of mixing and dewatering applicable to chemical and industrial processes; small working models of Dorr equipment. The special feature will be a miniature sewage treatment plant. In charge of exhibit:—P. M. McHugh, N. Spicer and H. W. Morgan.

P. W. Drackett & Sons Co., Cincinnati. Booth 252

(Mezzanine)

The display of this company comprises a line of samples of the various chemicals produced by its plants. These number about 65, of which the principal ones are Diamond D caustic soda, sulphate of magnesium, bleaching powder and lye. The display is also featured by a showing of the various methods of packing chemicals, including containers, shipping cases, boxes, barrels, cylinders, etc. P. W. Drackett, Jr., general sales manager of the company, is in charge of the booth. His assistants are B. S. Hull, chemical director, and Hugo Juhlin, advertising manager.

Draper Manufacturing Co., Cleveland. Booths 544 and 545

(Third Floor)

This company is exhibiting a full line of its steel drums and other containers for chemicals. H. W. Lees, sales manager, is handling the booths for the company.

Drying Systems, Inc., Chicago. Booths 569, 570 and 571

(Third Floor)

A full line of drying equipment is exhibited by this company. An interesting and comprehensive view is given of the various products of the firm. F. A. Lippert, R. E. Lippert and C. H. Currier are handling the display for the company.

The Duriron Co., Inc. Dayton, Ohio. Booth 43

(Main Floor)

The company is offering a display of its Duriron apparatus. The exhibit is featured by a special film showing "The Story of Duriron." This is shown in the booth of the firm. The company has a large staff of executives and assistants at hand to describe and demonstrate the various types of equipment headed by the president of the company, P. D. Schenck. W. E. Hall and J. R. Pitman, vice-presidents; J. Dart, Jr., secretary; Messrs. Elkins, Suverkrop, Jaffe, VanEtten, Schatzabel, of the New York office, together with O. Jacobsen, chief engineer, and H. R. Daniels, advertising manager, complete the staff.

Dunning Lueckel Engineering Co., New York City. Booths 739 and 740

(Fourth Floor)

This company is showing a line of ring pulverizers and crushers made by the American Pulverizer Co. An A. W. Wilson filter press is also displayed. The feature of the display is one of the large ring pulverizers in sections showing the entire mechanism and construction. The exhibit is handled by Harry Dunning, W. J. Lueckel and Paul Knittle, engineer of the American Pulverizer Co.

Du Pont de Nemours Co., E. I., Wilmington, Del. Booths 7, 8

(Main Floor)

This company will exhibit products of the following divisions:—Lithopone, dry colors and pigments division, chemical products division, acids and heavy chemical divisions and dyestuffs sales division. Special attention will be given to the display of dyes.

E

Eagle-Picher Lead Co., Chicago, Ill. Booths 524, 525 and 526

(Third Floor)

This company will have on exhibition a sublimed white lead plant, complete in all detail, and illustrating the manufacture of this pigment. Of course, the plant will be reduced to a model size for the purposes of the display. These products will be on display:—White lead carbonate, red lead, litharge, orange mineral, sublimed white lead, sublimed blue lead. Specimens of all final products in which these pigments are used will be on view; also, babbitt metal solders, lead pipe, rod, tubing; block tin pipe, rod, tubing; lithopone, slab zinc, and sulphuric acid. H. Gates, A. F. Brown, C. E. Gilson, L. E. Kelly and J. R. MacGregor will represent the company at the booths.

East Jersey Pipe Co., Paterson, N. J. Booths 656, 657

(Fourth Floor)

Exhibits "Hercules" centrifugal extractors, direct flexible electric driven, in large and small sizes. Demonstrations are made of the many improvements embodied in the "Hercules" extractors. Representatives are H. H. Stephens, J. L. Haring and F. A. Tolhurst.

Eastman Kodak Co., Rochester, N. Y. Booths 217 to 221 Incl.

(Second Floor)

Displays Eastman organic chemicals, tested chemicals for photographic uses, scientific applications of photography and photographic laboratory apparatus. A feature of the exhibit is the display of over two hundred rare organic chemicals for research purposes; photomicrographs; colloidal fuel; calorimeters for field and laboratory uses; x-ray appliances; photographic filters and wedges. Representatives at the exposition are I. N. Hultman, W. B. Haskell, H. C. Finck, C. J. Van Allen, Anne Davis and Katherine Ogden.

Economy Engineering Co., Chicago. Booths 434, 435

(Third Floor)

The exhibit provides such features as the Economy System of storage handling, consisting of hand-power or electrically operated tiering machines. Portable elevators for warehouse and for special purposes. Steel racks for the storing of barrels or drums of chemicals, oils, dyestuffs, etc. This machinery will be in operation, and a miniature warehouse equipped with the above machinery (reduced) will show its benefits. T. R. Tordoff, manager of the New York office, will be assisted at the booth by T. A. Duffey, general sales manager; L. H. Liebel, George B. Skinner, New York city salesmen.

Egyptian Lacquer Mfg. Co., New York City. Booths 752 and 753

(Fourth Floor)

This company's products—lacquers, thinners and enamels—will be attractively displayed, and with them, a comprehensive line of finished articles, on which the products were used. The finished specimens will include some of unique finish and unusual nature, and bring to the fore the progress in the scope and utility of the products made by Egyptian Lacquer. These men will represent the company:—Messrs. Sopher, De Baun, Popper, Hayward, Henry and Schlott.

Eimer & Amend, New York City. Booth 58

(Main Floor)

These exhibits will be shown at the booth of this well-known firm:—Freas Electric Oven No. 100; New Hevi Duty Electric Furnaces; muffle, crucible and tubular types; Replaceable Unit Hot Plates; MacMichael Viscosimeter; Bingham & Green Viscometer and Plastometer; Freas Vacuum Ovens; U. S. Navy Improved Emulsifier for Oils; Juerst Ebullioscope; Silverman Illuminator; Wysor Grinding and Polishing Apparatus; Microscopes; Hortvet Cryoscope; Refractometers; Polariscopes; Pickel Extraction Apparatus; Gramercy stoppers. Theodore Taistra will have charge, and others in attendance at times will be C. G. Amend, Walter R. Eimer and F. Wilbur Shulenberger.

Electro Bleaching Gas Co., New York City. Booths 321, 322

(Mezzanine)

This exhibit, located on the mezzanine floor, will display products which have required liquid chlorine in the process of their manufacture, in its demonstration of liquid chlorine for which output it has built up a large trade. Those who will be in attendance are James B. Duggan, S. W. Jacobs, S. I Escoett, George R. Ellis, W. A. Kennedy.

Electron Chemical Co., Portland, Maine. Booths 401, 402

(Third Floor)

An interesting showing will be presented of the Allen-Moore Cells for production of chlorine and caustic soda by this prominent New England company. Kent R. Fox and Howard D. Marsh will have charge of the booth.

G. H. Elmore, Philadelphia, Pa. Booth 209

(Mezzanine)

The 24-inch centrifugal will be seen at this booth as a feature. G. H. Elmore, of the 24-inch Continuous Centrifugal, will be at the booth, as will R. W. Rigler.

Elyria Enameled Products Co., New York City. Booth 92

(Main Floor)

The exhibit includes several new glass enameled units (Elyria), in addition to specimens of standard chemical units exemplified by the Elyria stills and kettles. The high pressure autoclave is the first American presentation of a unit of that type having a removable enameled liner. The condenser shown for the first time embodies a construction permitting the building up of a glass lined condenser presenting sufficient cooling surface for large commercial operations, and yet remain a compact unit. The combined still, condenser and receiver forms an integral unit permitting atmospheric or vacuum distillation entirely in glass lined equipment. It illustrates one of the many types of complete Elyria installations. The exhibit includes two two-gallon stills, two high-pressure autoclaves, a complete distillation unit, and a 100-gallon tilting kettle.

At the booth:—W. E. Gray, Sr., supervising; E. P. Poste, M. Donauer, W. E. Gray, Jr., R. W. Smith, D. E. Etters, S. A. Smith, R. F. Goecke.

Empire Laboratory Supply Co., New York City. Booth 344

(Mezzanine)

The commodities to be shown by this company include chemical glassware such as Pyrex tubing, hydrometers, thermometers, Pyrex glassware, chemical apparatus, and other supplies.

In charge:—M. A. Goldstein, E. C. Weiskopf, Phil Freedman, H. L. Thompson, J. C. Headley, Harry Freedman.

Charles Engelhard, New York City. Booths 499, 500

Among the important equipment to be shown, and of interest to the show-goer, will be Engelhard pyrometers, indicating and recording; electric resistance thermometers, electric furnaces, transparent quartz glass, Impervite refractories, scientific mercury vapor lamp (ultra violet). Carleton W. Hubbard will represent the exhibitor.

Everlasting Valve Co., New York City. Booths 37, 38

Shows Everlasting valves for boiler blowoff; acid service; storage tanks, etc. The representatives are John H. Allen, president; W. G. Wilson, engineer, and E. N. Corning, sales engineer, is in charge of the exhibit.

Excelsior Dyestuff & Chemical Co., New York City. Booths 732, 733

The company represents and is showing the products of the Beaver Chemical Co., Damascus Va., and Universal Aniline Dyes & Chemicals Co., South Milwaukee, Wis. The Beaver Chemical Co. manufactures a sulphur blue known in the market as Sulphur Blue B. C., extra concentrated, and Sulphur Blue B. C. R. extra concentrated. The Universal Aniline Dyes & Chemicals Co. manufactures direct colors, especially direct blue and direct sky blue. The products of both these factories are shown. Representatives in attendance are:—Walter Reinicke, Charles Frankel and Henry Lutzen.

F

Falcon Dye & Chemical Co., New York City, Booths 754, 755

(Fourth Floor)

Displays dyestuffs manufactured by the firm and demonstrates dyeings of the colors, etc. Is represented by Dr. E. C. Altvater and J. Oettinger.

W. L. Fleisher & Co., New York City, Booth 242

(Mezzanine)

This company will present in operation a conditioning apparatus and a spray dryer for foodstuffs in liquid form and for chemicals in solution, suspension or emulsion form. W. L. Fleisher, president; A. W. Lissauer, vice-president, and D. L. Connelly, of the Spray Dryer department, are to be at the show.

Florasynth Laboratories, Inc., New York City, Booth 513

(Third Floor)

exhibits aromatic chemicals, inclusive of perfumers' raw materials; flavoring extracts; perfume oils; pharmaceuticals, etc. A feature of the exhibit is the display of benzyl benzoate—medicinal. Representatives are Louis A. Rosett, Charles L. Senior and Alexander Katz.

Foamite Firefoam Co., New York City, Booth 621

(Fourth Floor)

displays a 2½-gallon Foamite Firefoam copper, Underwriters' approved extinguisher; 40-gallon Foamite Firefoam engines; carbon-tetrachloride ext. pump type; carbontetrachloride ext. air pressure type; soda and acid extinguisher. Characteristics of Firefoam are displayed, such as the effect of 3,200 degrees of heat on Firefoam; non-injurious characteristics on clothing, polished surfaces, etc.; tenacity of Firefoam and expansion test. In charge of the exhibit are R. H. Austin, manager, New York sales division; Myron Hovey and Frederick M. Morrison.

Foote Mineral Co., Philadelphia, Pa., Booth 66

(Main Floor)

Motion pictures of scientific interest and a demonstration of the refractory properties of zirlate zirconium oxide will be provided here. Samples of products of ore, and the raw material itself, will be shown; together with rare element compounds. W. M. Foote, H. C. Meyer and Samuel Bell represent the exhibitors.

The Foxboro Co., Foxboro, Mass., Booths 346, 347

(Mezzanine)

This company will exhibit gauges for indicating and recording pressure and vacuum, the measurement of time, temperature, and liquids, and gas analysis for the boiler room, etc. Some instruments can be seen in actual operation. W. W. Patrick and E. P. Grout will be at the show.

G

Wm. Garrigue & Co., New York City, Booths 284, 285

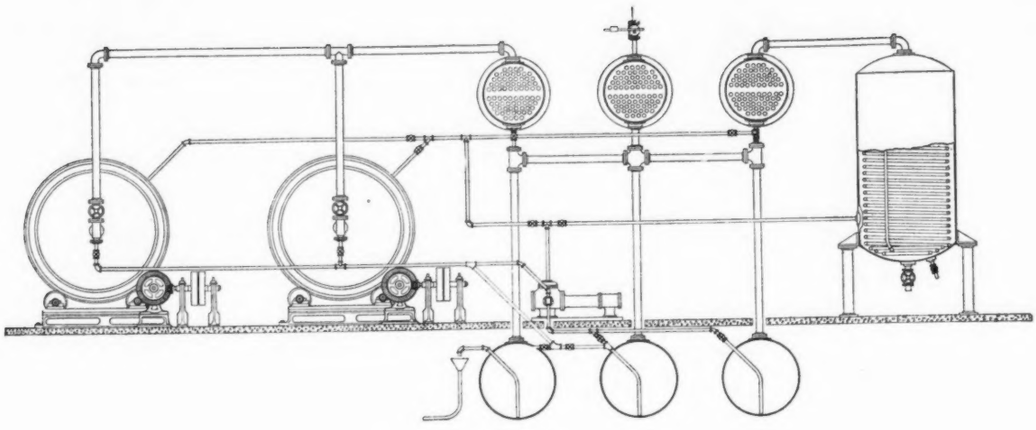
(Mezzanine)

Samples of oils, fats, glycerines and soaps in the stages of processing will be the features of this exhibit. Plants for the refining of oil, refining and recovery of glycerine, distillation of fatty acids, fat splitting and soap making will be given a prominent place. By these demonstrations there will be afforded an opportunity to learn much of the oil and fat business. J. W. Bodman, C. H. Wurster and W. E. Sanger will be at this exhibit, and prepared to answer questions.

Garrigue Rotary Oil Extraction Plant

(Patented)

Edible Oils *Inedible Oils*



Applicable to the Direct Extraction of

EDIBLE OIL from
- Crushed Seeds
- Oil Cakes
- Nuts, all kinds

INEDIBLE OIL from
- Animal Tankage
- Garbage
- Bones

It is built in two types
- For Coarser Materials
- For Fine Materials

The principal advantages of the Garrigue Rotary Extractor are:

1. Most complete extraction.
2. No odor of solvent remaining in extracted oil or meal.
3. Low solvent loss.
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Engineers for Oil, Fat and Glycerine Plants

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Chas. F. Garrigues Co., New York City, Booths 716, 717

(Fourth Floor)

Exhibits among other things, steel drums, quicksilver and the products of the Norsk Hydro-Elektrisk Kvoelstofaktieselskab of Kristiania. Members of the organization are on hand at the booth at all times.

Geigy Co., Inc., Booths 712, 713 and 714

(Third Floor)

Shows dyestuffs. The exhibit is in charge of Robert J. Keller, Walter Saenger, W. F. Kip and W. F. Zipse.

General Bakelite Co., New York City, Booth 3

(Main Floor)

Here will be in operation a moulding press, showing the method of producing Bakelite moulded parts. Also, an exhibition of Bakelite raw materials and finished products manufactured from them. Those in attendance will be Hylton Swan, Wm. S. Gordon, Jr., H. S. May, L. M. Rossi.

General Briquette Co., New York City, Booth 742

(Fourth Floor)

Shows briquettes made from wood, peat, lignite, soft and hard coal and turnings and millings of various metals and other substances. The exhibit is in charge of A. L. Stillman, J. E. Stevens, J. Sprung and R. Ralli.

General Briquetting Co., New York City. Booth 742

(Fourth Floor)

Briquets made from fine fuels and fine chemical and metallurgical by-products. In charge of exhibit:—A. L. Stillman, J. Sprung and J. E. Stevens.

General Ceramics Co., New York City, Booth 2

(Main Floor)

Booths 222, 223, 224

(Mezzanine)

In Booth 2 an almost complete line will be shown of fused silica for laboratory equipment; also, samples of refractory clay materials, such as burners, nozzles, gas mantle rings, etc. Standardized acid proof stoneware containers, apparatus, and machinery will be shown on the mezzanine floor, as will also apparatus and machinery. A muriatic acid plant will be in operation there too. Those at the booths:—Percy C. Kingsbury, K. J. Peters, R. S. Beecher (all mezzanine floor); Joseph C. Curran, A. C. Otts (Booth 2 representatives).

General Electric Co., Schenectady, N. Y., Booth 5

(Main Floor)

Products of laboratory experiments will be shown here by this New York manufacturer, together with microscopic photographs of arc welding. An opportunity will be afforded to gain much information at this booth by means of the photographs.

General Chemical Co., New York City, Booths 17 and 18

(Main Floor)

A model—working—of the Pulaski Foundry sulphuric acid tank car will be shown for the first time. The New Herreshoff Furnace for roasting ores will also be in operation daily. Reagent chemicals of the Baker & Adamson Works will be displayed. Among those in attendance:—A. W. Hawkes, vice-president; G. G. Ackerson, sales manager; C. E. Shean, George N. Vardy, J. H. Eberhardt, M. M. Biddison, J. E. Willson, R. P. Silva, W. J. Kramer, J. L. Thomas.

General Filtration Co., Inc., Rochester, N. Y., Booth 251

(Mezzanine)

At this booth will be on exhibition daily the Filtros uniformly porous acid-proof artificial stone filter plates which are used for filtering acid and neutral liquors, and for diffusing air and the various gases; Filtros acid-proof cement; Electro-Filtros acid-proof diaphragms for use in acid electrolytes; acid-proof stoneware girders for supporting Filtros plates as false tank bottoms, also small models showing installation of plates. Special and odd shapes in which Filtros can be manufactured will be exhibited, including special curved plates for lining centrifugals and for lining and covering filter wheels. F. E. Leiby, sales manager, and Col. W. W. Robacker, director, will have charge.

Glamorgan Pipe & Foundry Co., Lynchburg, Va., Booths 508, 509, 523

(Third Floor)

Shows a scale model of a continuous discharge gas-fired vertical lime kiln, a standard flaker and congealing machine, a standard nine-compartment continuous suction filter, and a standard 12x14 duplex high efficiency exhauster. A feature of the exhibit is a filter and exhauster shown in operation together filtering common salt. Representatives are C. H. Hinnant and W. D. Mount.

Gottesman, M., & Co., Inc., New York City, Booth 711

(Fourth Floor)

Industrial chemicals for the paper and pulp industry, such as sulphate of soda, a sulphate of alumina, bleaching powder, china clay, casein, rosin, blanc fixe and soda ash. In charge of exhibit:—Arthur J. Sigel, Guy A. Gardner and E. A. Pita.

Glens Falls Machine Works, Glens Falls, N. Y., Booth 32

(Main Floor)

An exhibit of merit will be seen at this booth, which will include the sulphur burner of the G. F. M. W., which is used successfully in the manufacture of S O_2 for the production of sulphurous and sulphuric acid. Its usefulness is demonstrated in these industries:—Sulphite pulp, sulphuric acid, copper bleaching, bleaching of grains, liquid sulphur dioxide, sugar refining, and extraction of fats from tankage. Fred S. Chaffee and Harold D. Wells are to be at the show.

Gordon Dryer Corp., New York City, Booths 228, 229 and 230

(Mezzanine)

Gordon High Efficiency Atmospheric Dryers in operation will focus attention to this display. Ideas of the high-class products turned out of the Gordon are seen by the samples of chemicals, colors, dyestuffs, pharmaceuticals and medicinals.

Thorough analysis of the drying problems of manufacturers, and explanation of the workings of the Gordon, will be made by the representatives in attendance, who are Nathan Owitz, sales manager; W. R. Murray, N. W. Park and Cornelius Winant.

Greeley Products Co., New York, Booths 772 and 773

(Fourth Floor)

Shows petroleum and pine products, heavy chemicals, intermediates, drugs, pharmaceuticals, fine chemicals, paint and varnish materials, and naval stores. There is an interesting display of the process of extracting wood rosin. The company is represented by A. H. Greeley, Jr.; W. H. Magoffin, H. A. Garmen, H. S. Kenyon and W. R. Boin, Jr.

Emil Greiner Co., New York City, Booths 215, 216

(Mezzanine)

At these booths will be shown chemical and scientific instruments, such as apparatus for testing various gases, explosives, dyestuffs and chemicals, representing the best examples of the glass-blowing art. Also hydrometers, thermometers, graduated volumetric and special glassware. Mr. Greiner, Emil Vonhof, P. Todtschinder and Max Kohn will be at the show.

Grinnell Co., Inc., Providence, R. I., Booth 227

(Mezzanine)

The Grinnell Automatic Sprinkler will be shown in actual operation:—A fire will be built at the booth hourly, and it will be put out by the automatic opening of the Grinnell Sprinkler Head, which is placed above it. The fire takes place in a special wire glass cabinet, which stands about fifteen feet high. Also will be shown the Grinnell dry pipe valves, alarm valves, etc. Thousands enjoyed the exhibit last year. These men will be in attendance:—Howard C. Branch, Providence, and Frank V. Sackett, F. S. Crans, Harry Walsh, Robert Nicholson, all of New York city.

H

Hamilton & Hansell, Inc., New York City. Booths 451, 452

(Third Floor)

Illustrations of electric-furnace installations. Information on general metallurgical processes such as ore dressing, smelting, chloridizing and leaching processes in accordance with the Ramen patents. Models of flue cleaners. In charge of exhibit:—H. A. De Fries.

Hanovia Chemical & Manufacturing Co., Newark, N. J., Booths 499 and 500

(Third Floor)

Exhibits electric resistance furnace, electric resistance thermometers, transparent quartz glass and quartz mercury vapor arc lamps. The company is represented by A. L. Schweickart, E. Simmonds, George H. Wilson, L. Witmondt, and W. S. Quimby.

S. F. Hayward & Co., New York City, Booths

(Fourth Floor)

Show safety devices, including engines, fire extinguishers, safety signs, respirators, helmets, hoods, gas masks, first aid equipment, and many other devices of a similar character. H. J. Lovell and J. W. Knoblock have charge of the exhibit.

Hardinge Co., New York City, Booth 60

(Main Floor)

Exhibits conical ball and pebble mills with the accessory parts necessary for different classes of operation. The application of a conical mill for crushing, grinding and pulverizing as applied to chemical, industrial and metallurgical processes, whether wet or dry, is illustrated. The company is represented by Wm. H. Baker, Harlowe Hardinge, R. B. T. Kilani, J. G. Parmelee, Donald S. Clark and S. R. Swain.

Hauser-Stander Tank Co., Cincinnati, Ohio, Booth 703

(Fourth Floor)

Tank of red gulf cypress lined with chemical lead with joints burnt in by hand; vacuum filter tank of long leaf yellow pine; methods of construction of wooden tanks. In charge of exhibit:—S. Hauser, Jr. and D. B. Dorfan.

S. S. Hepworth Co., New York City, Booths 35 and 36

(Main Floor)

Shows an electrical centrifugal machine in full operation. C. A. Olcott, E. Foster Babbitt and G. F. Brindley represent the company.

Haynes Stellite Co., Kokomo, Ind., Booth 250

(Mezzanine)

Among the products exhibited by this company are lathe tools, milling cutters, surgical instruments, dental instruments and table and pocket cutlery. Raw materials are also shown in various forms. A feature of the display is a collection of instruments in various chemical solutions which affect steel but not stellite. Of interest also is the display of instruments from raw materials to finished products, and a demonstration of the immunity of stellite instruments to sterilizing processes.

Hercules Powder Co., Wilmington, Del., Booths 323, 324, 325

(Mezzanine)

Exhibits explosives, showing samples of the company's products as supplied the trade and also a number of finished materials made from our products. The company also makes a display of naval stores. W. M. Annette and G. C. O'Brien are in charge of the exhibit.

Herold China & Pottery Co., Golden, Col., Booth 226

(Mezzanine)

Exhibits a line of chemical and scientific porcelain. H. F. Coors is in charge of the exhibit.

Hooker Electrochemical Co., New York City, Booths 10, 11

(Second Floor)

Shows caustic soda and chlorine products, with specialties in anhydrous metallic chloride and unusual chlorine; also antimony crimson and antimony golden. W. H. Chamberlain and B. K. Hotchkiss are the representatives.

Hoskins Manufacturing Co., Detroit, Mich., Booths 296 and 297

(Mezzanine)

Shows electric laboratory furnaces, hot plates, pyrometers and heat-resistant castings. There is a demonstration of "making your own thermo-couples." Charles S. Kinnison, W. D. Little, F. L. Zimmerman and A. L. Malmstrom are in charge of the exhibit.

Howes Publishing Co., New York City, Booth 741

(Fourth Floor)

Exhibits its publication, the American Dyestuff Reporter. A. P. Howes has charge of the booth.

Huff Electrostatic Separator Co., Arlington, Mass., Booth 44

(Main Floor)

Shows an electrostatic separator and plumb pneumatic jig. The company is represented at the exposition by H. B. Johnson and W. E. McKee.

Hunter Dry Kiln Co., Indianapolis, Ind., Booth 493

(Third Floor)

Exhibits a model of the Hunter humidity drier and samples of the products dried. Representatives are Harry Hunter, Oren M. Ragsdale and A. B. Stonex.

Huyck, F. C. & Sons, Albany, N. Y., Booth 567

(Third Floor)

Woolen filter cloth. In charge of exhibit:—D. A. MacInnes, E. A. Rees and A. V. Wright.

I

Independent Chemical Co., New York City, Booths 565 and 566

(Third Floor)

Exhibits the products of the Vulcan Detinning Co., including tin bichloride, caustic soda, crystals, oxide and tetra chloride; also the products of the Stauffer Chemical Co., including carbon bisulphide and refined nitrate of soda; also the products of the King Chemical Co., including acid phosphate, agricultural chemicals, blue vitriol, nitric acid, sulphur dioxide, sulphuric acid and sulphurous acid. In the same booths the Sterling Color Co. shows a full line of American made wool, silk and cotton colors. R. H. Ringen is in charge of the exhibit of the Sterling Color Co., and O. Crispens of that of the Independent Chemical Co.

Industrial Filtration Corp., New York City, Booth 67

(Main Floor)

Shows a rotary filter in operation equipped with a new drying device, also a rotary dewatering hopper and an open tank filter. The exhibit is in charge of Arthur Wright, George D. Dickey and H. W. Conrad.

Innis, Speiden & Co., New York City, Booths 745, 746

(Fourth Floor)

Has on view a line of samples showing industrial chemicals, colors etc., which the company is making at Niagara Falls, N. Y.; Murphysboro, Ill., and Jersey City, N. J. In addition the company exhibits samples of materials for which it is selling agent for other manufacturers.

International Carbon Products Co., New York City, Booth 44

(Main Floor)

Exhibits graphite and graphite products. The company is represented by H. B. Johnson, C. D. Burrage, Jr., and J. F. Short.

Industrial Electric Furnace Co., Chicago, Ill., Booths 454, 455

(Third Floor)

New type of electric melting furnace for operation on a 220 volt d. c. motor circuit. In charge of exhibit:—F. von Schlegell, W. B. Cooley, L. C. H. Groeger and W. B. Lewis.

International Nickel Co., New York City, Booths 456, 457, 458

(Third Floor)

Displays monel metal equipment. Monel metal is a natural nickel alloy containing 67 per cent. nickel, 28 per cent. copper and 5 per cent. other metals. It has the qualities of resisting alkalies, most acids, high heats and corrosion. Because of these characteristics monel metal finds a large use in equipment used in the chemical industry. F. H. Waycott, T. H. Dauchy and E. S. Wheeler are the representatives.

International Salt Co., New York, Booth 735

(Third Floor)

Shows salt. The company is represented by H. J. Osburn, G. A. Walters and W. T. Chisholm.

Irving Iron Works Co., New York City, Booth 440

(Third Floor)

Exhibits flooring and steps. The firm is represented by W. E. Irving, P. L. Price, H. H. Schuldt, J. M. Madden and A. S. Kennedy.

J

Jewell Polar Co., Chicago, Ill., Booth 428

(Third Floor)

Exhibits gas and electrically operated water distilling apparatus. A. C. Jewell, John E. Bloeser and P. M. Marks represent the company.

Joplin Whiting Co., Joplin, Mo., Booth 635

(Fourth Floor)

Exhibit consists of a display of jars of whiting in charge of S. A. Fones, sales manager.

K

Kalbeisch Corporation, New York City, Booths 555 and 556

(Third Floor)

Exhibits heavy chemicals. C. L. Hutzelman and V. P. Davis represent the company at the exposition.

Kenart Synthetic Products Co., Chicago, Ill., Booths 405 and 406

(Third Floor)

Shows aromatic synthetics, food colors, caustic potash sticks, rare analytical chemicals and other synthetic products. There are shown large sized samples of metallic potassium also saponines. S. W. Kendall, Dr. C. H. Bacon and H. S. Stewart represent the company.

Maurice A. Knight, East Akron, O., Booths 484, 485 and 486

(Third Floor)

Shows chemical proof stoneware. The firm is represented by Maurice A. Knight, Charles Dennison, S. J. Baril, N. D. Whipple and C. G. Urquhart.

Knoxville Board of Commerce, Knoxville, Tenn., Booths 326 to 331

(Mezzanine)

Displays a varied line of metallic and non-metallic minerals produced in the section embraced within a 100 mile radius of Knoxville. Features of the exhibit are Tennessee marble, Mascot zinc, Embreeville zinc, Copperhill and Ducktown copper, Mayville aluminum, LaFollette iron and bituminous coal. Representatives in attendance at the exposition are M. F. Nichols, consulting chemist; Prof. J. A. Switzer, of the State of Tennessee Geological Survey; C. H. Gordon, geologist, University of Tennessee; Dr. Walter McIntyre, chemist, University of Tennessee; Charles Weller, geologist; Mr. Newman, geologist for American Zinc Co.; Prof. Harry Clark, Judge Hugh M. Tate, William R. Pouder, manager Knoxville Board of Commerce.

The Koppers Co., Pittsburgh, Pa., Booths 312 and 313

(Mezzanine)

Show data and other particulars pertaining to by-product coke and gas plants. A feature of the exhibit is a sectional model of a battery of Koppers triangular flued coke and gas ovens. Representatives are E. L. Crowe and C. R. Meissner.

L

Lammert & Mann, Chicago, Ill., Chicago Booth 345

(Mezzanine)

Shows rotary pumps, dry vacuum and pressure. R. F. Lammert, A. L. Eisenbies and Donald Rosie represent the company.

Laurel Soap Manufacturing Co., Philadelphia, Pa. Booth 733

(Fourth Floor)

Textile soaps, sizing and finishing material.

Lead Lined Iron Pipe Co., Wakefield, Mass., Booth 465

(Third Floor)

Shows all sorts of lead lined pipes. D. H. Regan and Frank H. DuBois are in charge of the exhibit.

Leeds & Northrup Co., Philadelphia, Booth 55

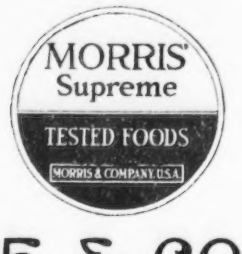
(Main Floor)

Exhibits a new form of optical pyrometer; a complete equipment for demonstrating the Hump method for the heat treatment of steel; a semi-automatic indicator for showing recalescence and decalescence points of steel; several types of thermocouple pyrometers of the potentiometer type, and much other apparatus of a similar character. The firm is represented at the exposition by P. E. Klonsteg, A. M. Redding, I. M. Stein, R. D. Milner, G. T. Tall, Jr.; C. H. English and E. B. Estabrook.

Loomis-Manning Filter Distributing Co., Philadelphia, Booth 633

(Fourth Floor)

Displays several standard filters of its own manufacture, and a filter cut open to show the interior construction, several parts to display details and a glass demonstrating working model which shows in actual operation the company's method of filtration and its unique and thorough method for cleaning the filter



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Makers of CASHMERE BOUQUET SOAP

Luxurious, Lasting, Refined

The American Tobacco Co.
INCORPORATED

ALL FAMOUS

TRADE-MARKS are wonderful things. None of those shown could be purchased for millions. They are not only a protection to manufacturers, but also a still greater protection to purchasers. For, if a manufacturer permits the quality of his product to fall off in the slightest degree, the very renown of his trade-mark will be his downfall.

The fact that more than three thousand "Proctor" Dryers are giving efficient and satisfactory service in plants all over the world contributes in no small way to the stability and merit of the "Proctor" Dryer trade-mark.

PROCTOR & SCHWARTZ, INC.
formerly
THE PHILADELPHIA TEXTILE MACHINERY COMPANY
PHILADELPHIA

"Proctor" DRYERS

beds. George H. Powell is in charge of the display.

Liberty By-Products Works, Inc., Passaic, N. J., Booth 626

(Third Floor)

Exhibits soaps, oils and chemicals. The company is represented by E. J. Zillessen, E. A. F. Zillessen, W. H. Zillessen, A. D. Washington, P. Meerbott, August Naab, Jr.

Lungmotor Co., The, Boston, Mass. Booth 283

(Mezzanine)

The Lungmotor for resuscitation in cases of apparent drowning, asphyxiation, electric shock, narcotic poisoning, strangulation and collapse during anesthesia. In charge of exhibit:—L. D. Jones and Max Jacobson.

Luzerne Rubber Co., Trenton, N. J., Booth 734

(Fourth Floor)

Hard rubber pipe, fittings, buckets and special parts for the chemical industry. In charge of exhibit:—H. E. Case.

Lindsay Light Co., Chicago, Booths 520 and 521

(Third Floor)

Shows charts showing the manufacture of gas mantles and derivatives of monazite sand. O. N. Berndt and Alexander Sinia represent the company.

The Lunkenheimer Co., Cincinnati, Booths 260 and 261

(Mezzanine)

Valves and lubricating devices. The firm is represented by H. S. Whitney, R. S. Rowe, W. A. Reynolds, F. R. Hyatt, Philip Smith, J. E. Cooper, H. J. McCloughan and Dr. G. K. Elliot.

M

Maas & Waldstein Co., New York City, Booth 620

(Fourth Floor)

This company displays a full line of lacquers and lacquer enamels. A feature of the exhibit are finished pieces of work showing different finishes in lacquer enamels and different finishes lacquered with transparent lacquers. H. C. Flanigan is in charge.

Magnesia Association of America, Philadelphia, Pa., Booth 658

(Fourth Floor)

This association, which comprises the Philip Carey Co., of Cincinnati, Ohio; the Franklin Machine Manufacturing Co., of Valley Forge, Pa.; the Keasbey & Mattison Co., of Ambler, Pa., and the Franklin Manufacturing Co., of Franklin, Pa., displays 85 per cent. magnesia pipe and boiler coverings for steam and power purposes. Samples of products, photographs of large installations, diagrammatic flow chart showing manufacturing processes of raw material to finished product, and literature giving scientific investigations of relative efficiencies constitute the exhibit.

Magnetic Manufacturing Co., Milwaukee, Wis., Booths 421, 422

(Third Floor)

Exhibits a high intensity magnetic separator, laboratory size, to test samples of ores and materials. Data on "high duty" magnetic pulleys and magnetic separators constitute an important part of the company's display. The booths are in charge of J. P. Bethke.

Mathieson Alkali Works, Inc., New York City, Booths 206, 207, 208

(Mezzanine)

Among the commodities exhibited by this concern are its "Eagle-Thistle" Brand products, which comprise soda ash, 58 per cent., both light and dense; caustic soda, 60, 70, 74, 76 per cent. fused ground, flaked; 78 per cent. (99½ per cent. pure). Castner electrolytic process; pure stick caustic; bleaching powder; liquid chlorine, 100 per cent. pure anhydrous; bicarbonate of soda, powdered and granular; Virginia soda; chlorine solvents—tetrachloride, ethylene chloride and other solvents. Features of this exhibit are the diagrammatic charts of the use of basic alkalies in industries and the various products of that use. The company is represented by John A. Kienle, general manager of sales; John W. Boyer, assistant manager of sales; J. A. Rose, district sales manager New England district; William D. Marshall, district sales manager Philadelphia district; G. N. Davis, salesman, and Dr. B. T. Brooks, chemical engineer.

Merck & Co., New York, Booth 89

(Main Floor)

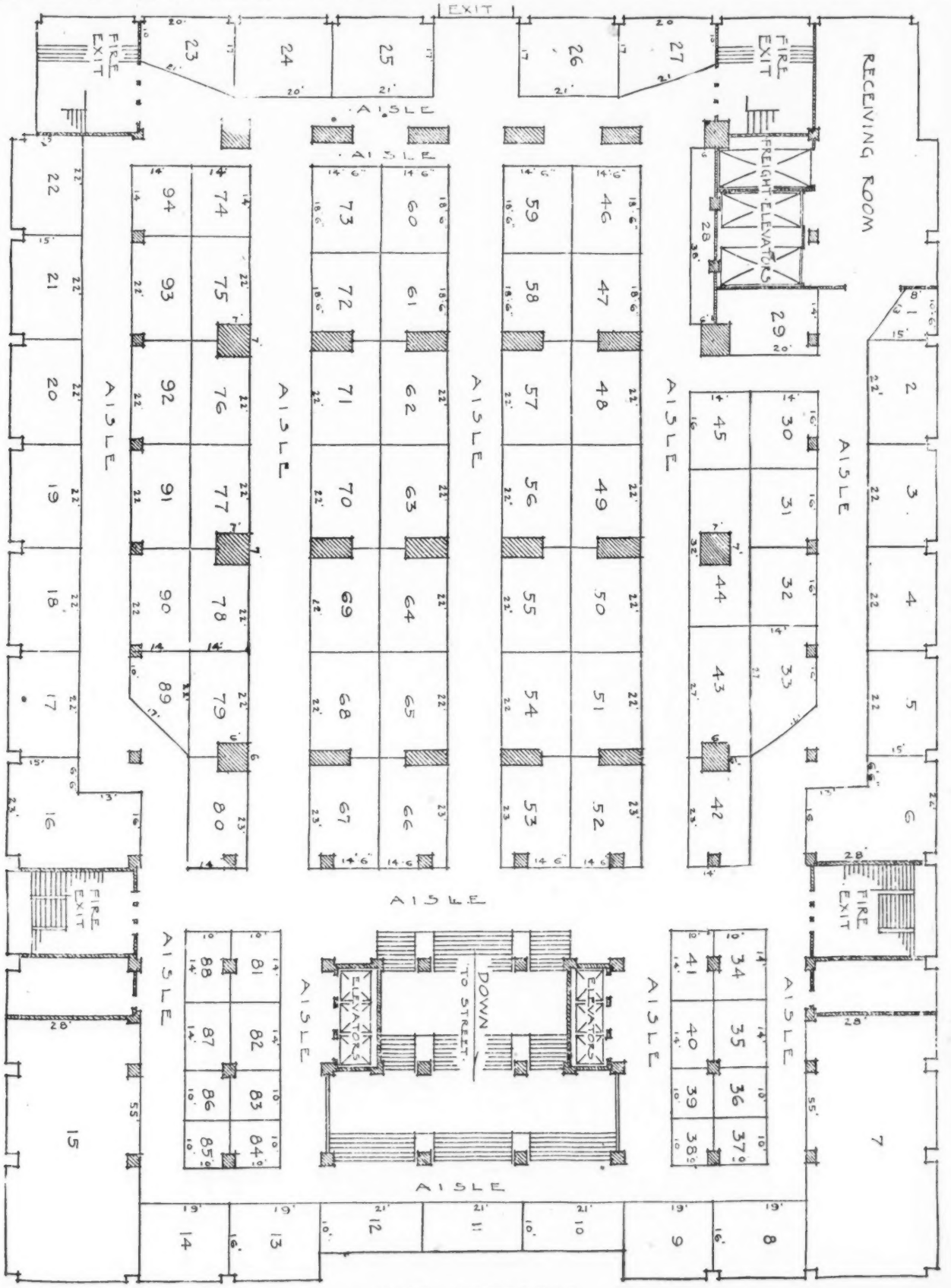
Exhibits chemical reagents and medicinal chemicals. The exhibits include bismuth salts, iodine, salicylates, salol, synthetic oil of wintergreen and other chemicals. Officers of the company are in attendance at the booth.

Metals Disintegrating Co., New York City, Booths 277, 278

(Mezzanine)

Displays samples of "Brand Superfine Products" such as zinc dust, tin dust, lead dust, tin oxide, red lead, litharge, aluminum powder and copper dust. S. G. Schatzberg is in charge of the exhibit. Other representatives are A. W. Hahn and E. A. Morris.

DIAGRAM OF BOOTHS ON MAIN FLOOR OF GRAND CENTRAL PALACE



ESTABLISHED 1875

CHAS. F. GARRIGUES CO.

54 WALL STREET
NEW YORK

CHICAGO:
10 SO. LA SALLE ST.

SAN FRANCISCO:
2 PINE STREET

BROKERS

Chemicals *Acids* *Oils* *Waxes*

for the following industries

Explosive *Soap* *Textile*

Leather *Paper* *Dye* *Fertilizer*

Wood Flour *Quicksilver* *Steel Drums* *Fullers Earth*

Sole Selling Agents for the

Norwegian Nitrogen Products Co., Inc.

Direct Importers and Distributors of the Products of the

Norsk Hydro-Electrisk Kvaelstofaktieselskab

KRISTIANIA, NORWAY

Nitrite of Soda 96-98% *Nitrate of Ammonia* *Nitrate of Lime*

See our exhibit at the
Sixth National Exposition of the Chemical Industries
Week of September 20th, 1920—Booths 716-717

Sole Selling Agents or Distributors for

NORWEGIAN NITROGEN PRODUCTS CO., Inc.
54 WALL STREET, NEW YORK

SAWYER TANNING COMPANY
NAPA, CALIFORNIA

CARSON QUICKSILVER MINING COMPANY
WILMINGTON, DEL.

HORACE J. HOLLEY & COMPANY
SEATTLE, WASHINGTON

VIRGINIA SMELTING COMPANY
BOSTON, MASS.

WELDED STEEL BARREL CORP.
DETROIT, MICH.

ESTABLISHED 1917

GARRIGUES INDUSTRIAL PRODUCTS CORPORATION

IMPORTERS :: EXPORTERS
AND
MANUFACTURERS' AGENTS

Mead & Co., Detroit, Mich., Booth 87

(Main Floor)

Showing Mead mills and featuring a "pony" mead mill for laboratory purposes. The company is represented at the booth by John Mead, Jr.

The Merrill Co., San Francisco, Calif., Booths 213, 214

(Mezzanine)

Exhibits the Merco Nordstrum line of plug valves. Representatives at the exposition are C. C. Broadwater, F. H. Ricker, H. P. MacGregor.

Miner-Edgar Co., New York City. Booth 231

(Mezzanine)

Cotton solutions for coating split and artificial leathers; solvents for cotton and celluloid; wood alcohol, acetone, methyl acetone; prepared clays for paper and paint manufacturers. In charge of exhibit:—Rolland H. French, J. J. Smith, Charles H. Zieger, George N. Bick, John W. Johnson.

Mine Safety Appliances Co., Pittsburgh, Pa., Booth 675

(Fourth Floor)

Displays different types of first-aid equipment and materials such as gas masks, oxygen breathing apparatus, etc. Is represented at the booth by H. J. Segrave and R. P. Mase.

Monarch Manufacturing Works, Inc., Philadelphia, Pa. Booth 412

(Third Floor)

Brass, iron, hard rubber and stoneware sprays, for use in sulphuric acid manufacturing plants; lead valves; lead siphons; oil burners, and an automatic acid elevator, which when attached to existing acid eggs elevates acid to any desired height automatically.

Monel Metal Products Corporation, Bayonne, N. J., Booth 457

(Third Floor)

In booth with International Nickel Co., showing monel metal. In charge of exhibit:—H. F. Chase and H. A. Cooper.

Mono Corporation of America, New York City, Booth 661

(Fourth Floor)

Exhibits CO_2, CO, O_2, H_2, CL and SO_2 automatically recording instruments for boiler plants, gas producer plants, cement and lime industries, etc. Also included in the display is apparatus to simplify the work of chemists by analyzing their gases automatically and graphically. Features of the exhibit are CO_2 (carbon dioxide) and CO (carbon monoxide) Mono for decreasing the fuel losses in boiler plants. The company's representatives are O. Rodhe, inventor; F. D. Harger, general manager and vice-president; C. Snyder, erecting mechanic.

Multi-Metal Co., Inc., New York City, Booths 254, 255

(Mezzanine)

Display consists of wire cloth, filter cloth and testing sieves. The concern's representatives are S. Stern, F. Stern, S. Pullman and L. Dresner.

N

Nash Engineering Co., So. Norwalk, Conn. Booth 91

(Main Floor)

Hytor compressors and vacuum pumps in operation; Jennings pump, motor and turbine driven, for handling combinations of liquid and gas. In charge of exhibit:—Irving C. Jennings, H. M. Wylie and G. B. Wright.

National Aniline & Chemical Co., New York City, Booths 20-22

(Main Floor)

Exhibits a comprehensive line of dyes and intermediates of their own manufacture. An unusual feature of the display will be lifelike figures, imported from France, and costumed in the latest modes by New York's leading designers, artistically grouped upon a piazza of a country house. The left hand and right hand sections are composed of exhibits of dyestuffs and intermediates (manufactured by this company) in artistic arrangement, all co-ordinated with an architectural and mural motif of great beauty.

Nassau Valve and Pump Corporation, Rockville Center, New York, Booth 634

(Fourth Floor)

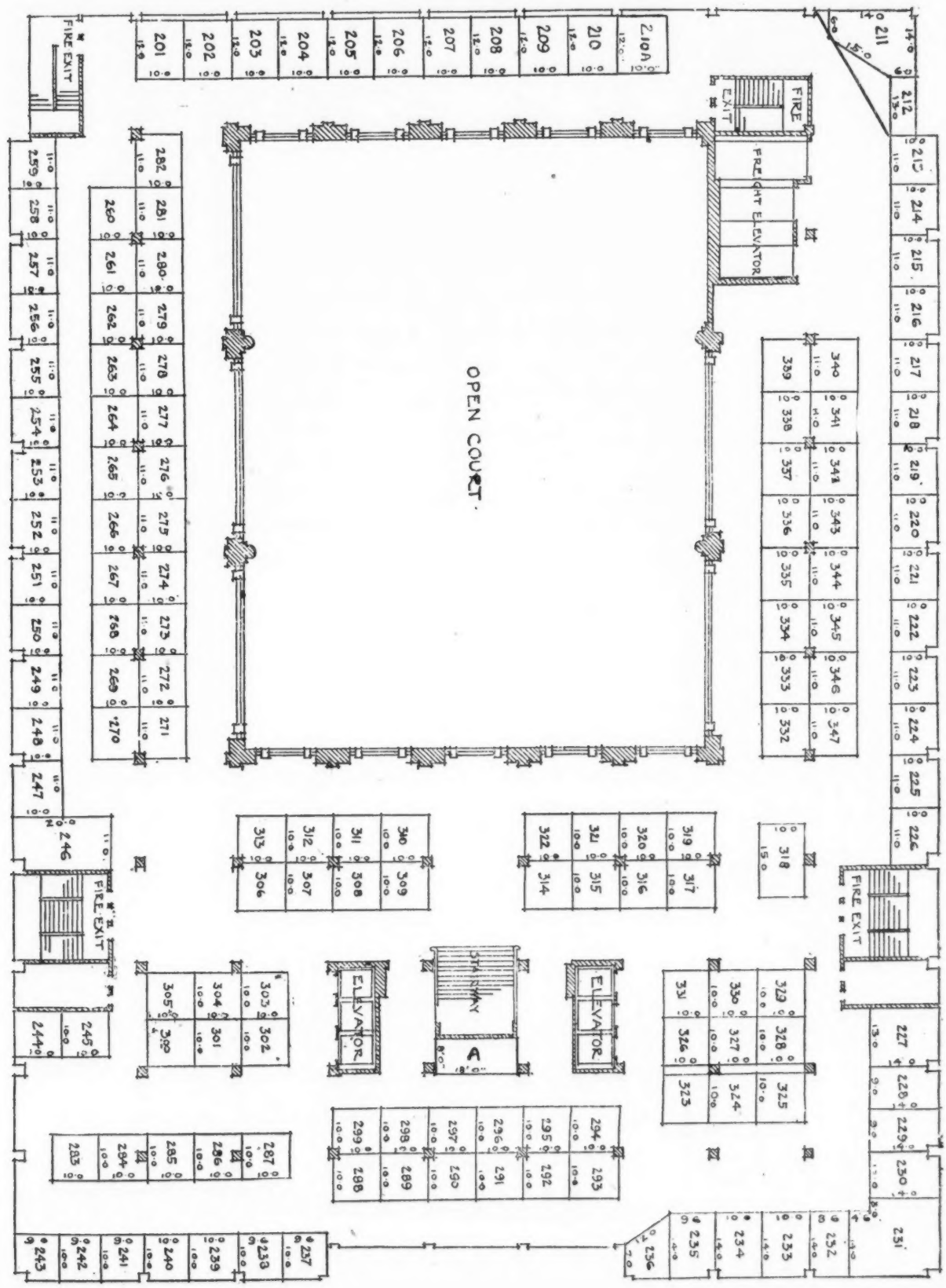
Displays "Chemetal" valves and centrifugal pumps. A feature of the exhibit will be a "Chemetal" centrifugal pump in operation. The concern's representatives are A. T. Havilend, E. J. Walsh, H. C. Evans and C. Schmitt.

National Gum & Mica Co., New York City, Booth 28

(Main Floor)

Displays pulp and colors manufactured by the Crescent Color & Chemical Works, Inc.; Permasol marking ink, crayon, etc., manufactured by the National Gum & Mica Co.; synthetic perfume bases manufactured by Nadal, Desparmet et Cie; also articles made by the National Glue & Gelatine Works. The following is the

MEZZANINE BOOTHS IN EXHIBITION ....



NATIONAL U.S.A. COLORS

The progress of the American dyestuff industry will be effectively shown by the exhibit of the National Aniline & Chemical Company, Inc., at the Sixth National Exposition of Chemical Industries, to be held at the Grand Central Palace, New York, during the week of September 20th.

From the crude and basic raw materials through the intervening steps of intermediates and finished dyestuffs to the actual utilization of the resulting colors in American daily life, and in the home, the steps of this progression will be indicated in a panorama of absorbing interest.

A cordial invitation to visit this exhibit is extended to all those interested in seeing for themselves the development in 1920 of this vital and pivotal industry.

National Aniline and Chemical Co., Inc.

21 BURLING SLIP

NEW YORK

personnel of the representatives staff:—A. Alexandre and L. Namy, in charge of perfumes; Messrs. Harris and Ardizzone, in charge of the Permasol marking inks and crayons; N. A. McManus, in charge of the pulp and color portion of the display, and representatives of the National Gum & Mica Co. in charge of the exhibit for the National Glue & Gelatine Works and the National Gum & Mica Co.

National Filter Cloth & Weaving Co., Brooklyn, N. Y., Booth 518

(Third Floor)

Displays a comprehensive line of cotton filter cloth. Representatives in charge of the booth are W. Smith and Edward Boffin.

New Jersey Zinc Co., New York City, Booths 8, 9

(Main Floor)

An interesting feature is an exhibit indicating the route of zinc ore in the manufacture of zinc products, as well as illustrating the ultimate uses of these products. Various zinc products of the "Horse Head" family are displayed. These include zinc oxide, lithopone, albalith, a new light-resisting pigment, ochre, slab zinc, rolled zinc, boiler plates, spiegeleisen, zinc dust, muriatic acid, salt cake, sulphuric acid and zinc chloride. W. Homer Hendricks, general sales engineer, is in charge. S. T. Ballinger, master painter, is assistant.

Newark Wire Cloth Co., Newark, N. J., Booths 298, 299

(Mezzanine)

Exhibit consists of wire, wire cloth, sieves, riddles, patented monel metal filter cloth, gasoline separator. The feature of the exhibit is a wire weaving loom in operation. The company's representatives are A. A. Campbell, in charge, and E. G. Nichols, of the sales department.

Newark Wire Cloth Co., Newark, N. J., Booths 298, 299

(Mezzanine)

Wire and wire cloth, chemists' testing screens, monel metal filter cloth; loom for weaving in operation. In charge of exhibit:—A. A. Campbell and E. C. Nichols.

New York Color & Chemical Co., New York City, Booth 627

(Fourth Floor)

Exhibits a full line of aniline colors and dyestuffs for all industries.

New York Container Co., Inc., Booth 729

(Fourth Floor)

Shows fiber shipping containers. The company is represented by O. Duryea, A. W. Hills, S. N. Stevens, C. H. Andrews, C. Ashmun and V. Stone.

Niagara Alkali Company, Niagara Falls, N. Y. Booths 314, 315

(Mezzanine)

Caustic potash, caustic soda, bleach powder, permanganate of potash and muriatic acid.

Nichols Copper Co., New York City, Booths 622, 623

(Fourth Floor)

This company's wall space is especially panelled in five divisions. Above the panels is a frieze of copper sulphate crystals in the form of long and graceful festoons. Running the entire length of the wall is a table containing four pyramids of the principal chemicals produced by the company—namely, copper sulphate, large crystals; copper sulphate, small crystals; nickel sulphate and copper oxide. These chemicals are set in burnished copper pans, each in front of a wall panel containing a descriptive legend. In front of the middle panel is a metallurgical exhibit in the form of a pyramid showing the reduction of copper from 2 per cent. ore through the several stages of concentrates, matte and blister to the refined product, which in this instance are model wire bars. The refinery shapes of finished copper are represented by different sized bullets, cakes, ingots and wire bars. The exhibit is in charge of G. P. Hitchcock.

Nitrogen Corporation, Providence, R. I., Booths 246, 247

(Mezzanine Floor)

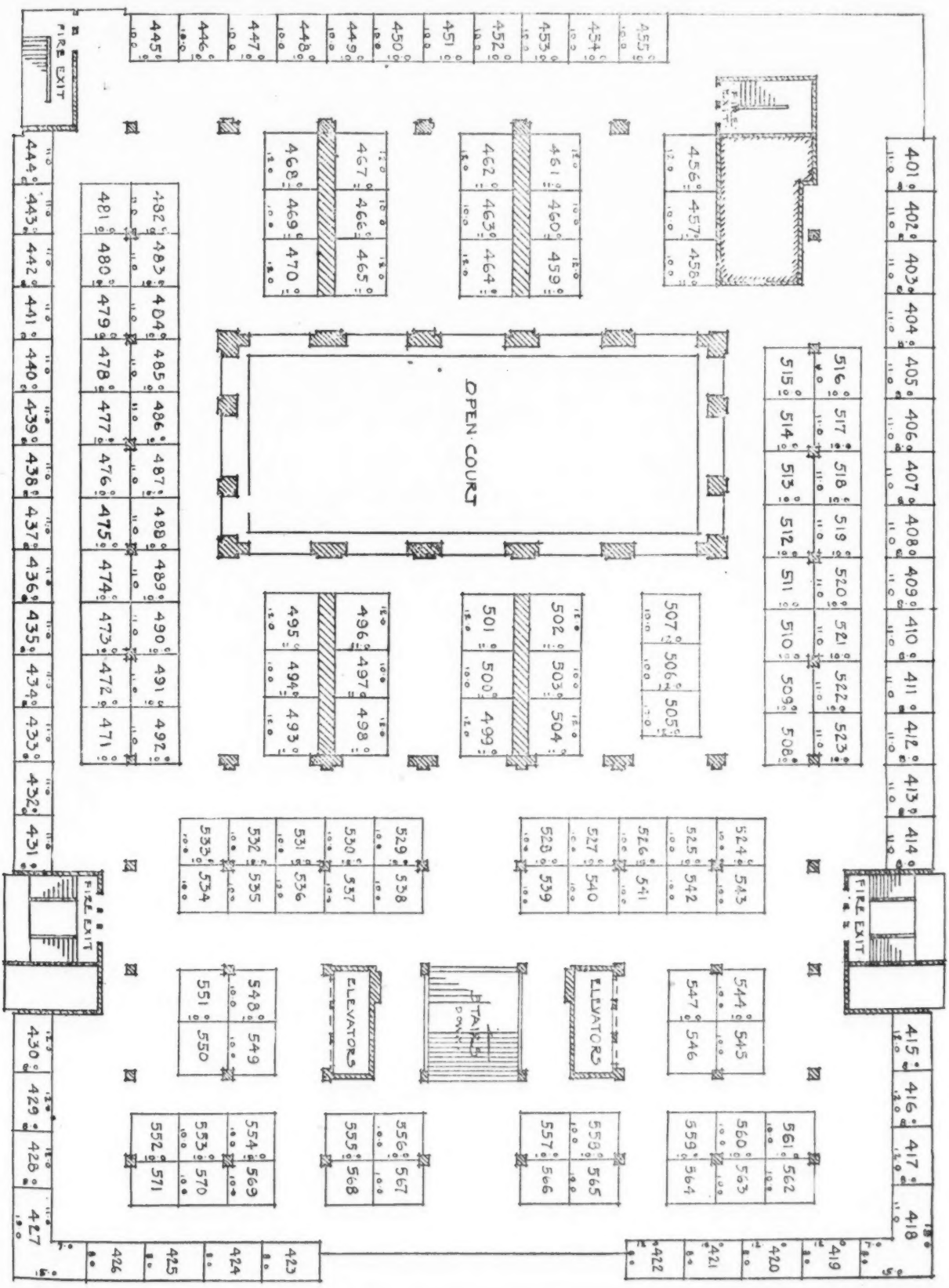
Exhibits are manufactures of C. P. anhydrous synthetic ammonia; ammonium sulphate, 100 per cent. purity; aqua ammonia; sodium cyanide, 98 per cent. purity, lump form or powdered form. Representatives are J. C. Clancy, A. Nagelvoort.

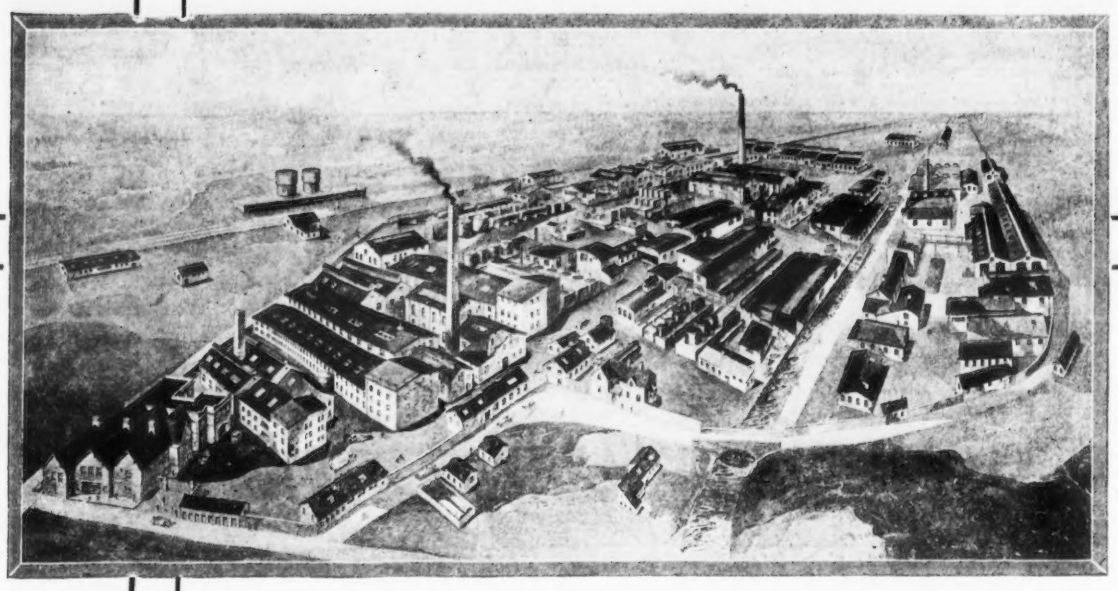
The Northwestern Chemical Co., Wauwatosa, Wis., Booth 683

(Fourth Floor)

Shows a line of organic esters, acids and salts, and also a line of synthetic flavoring materials. In charge of the booth are

THIRD FLOOR DIAGRAM OF SHOW BOOTHS





Works
at
RUABON
N. WALES

THE GRAESSER-MONSANTO CHEMICAL WORKS, LTD.

is an amalgamation of the British interests of

Monsanto Chemical Works
of ST LOUIS, U. S. A.

and the old established firm of

R. GRAESSER, Ltd.
of RUABON, NORTH WALES

Leading European Manufacturers of
Phenol Cresols and Allied Products

The new firm is beginning the manufacture, at its works in Ruabon, the fine and medicinal chemicals produced by the parent company in Saint Louis

Offices are maintained in London at
62 LONDON WALL E. C.

Monsanto Chemical Works
SAINT LOUIS, U.S.A.
Manufacturers of
Fine and Medicinal Chemicals, Intermedirtes
and Heavy Chemicals

Robert L. Wilson, general manager, and Henry J. Beck, sales representative.

Nitro Products Co., New York City, Booth 666

(Fourth Floor)

H. acid. In charge of exhibit:—W. H. Van Winckel and H. D. Wellmann.

Norton Co., Worcester, Masss., Booth 34

(Main Floor)

Display consists of a full line of alundum and crystolon refractories for laboratory and plant. Charles W. Saxe and Robert Kirkpatrick are in charge of the exhibit.

O

The Obermayer Co., Pittsburgh, Pa., Booth 466

(Third Floor)

Part of the display is an electric furnace to demonstrate the company's "Hott-Patch" furnace cement. This material is a high temperature resisting furnace cement used for lining furnaces of all types where temperatures up to 3100 degrees F. are reached. Representatives in charge are E. D. Frohman, John L. Cummings, J. M. Hildebrand and H. E. Beckman.

Oliver Continuous Filter Co., New York City. Booths 269, 270

(Mezzanine)

A small size Oliver continuous filter in operation. In charge of exhibit:—R. G. Walker, H. A. Morrison, P. M. Depp and W. A. V. Thomsen.

Organic Salt & Acid Co., New York City, Booths 294 and 295

(Mezzanine)

Shows its products, including salicylic acid, sodium salicylate, salol, methyl salicylate, acetyl salicylic acid, technical salicylic acid. Karl H. Koibe is in charge.

Ozone Company of America, Milwaukee, Wis., Booths 515, 516

(Third Floor)

Exhibits methods and apparatus showing the application of ozone to the purification of water for municipal plants, drinking water systems for factories, hotels, etc., and swimming pools. Therapeutic uses of ozone are demonstrated by apparatus for producing oxygen vapor. Representatives in charge are William J. Eberle, president, and C. O. Riedel, M. E., chief engineer.

P

Palo Company, New York City. Booth 82

(Main Floor)

exhibits a line of laboratory supplies and assayers' materials, and chemicals and reagents, including Hess-Ives tint photometers, Link automatic water stills, Goerz polariscopes, Durieux filter paper, analytical balances, Meker burners and furnaces, etc.

Parks-Cramer Co., Fitchburg, Mass., Booths 552, 553

(Third Floor)

Completely assembled Merrill process system of fluid heat transmission, available for easy inspection; principal parts of the Cramer air-conditioning system. In charge of exhibit:—Albert W. Thompson, Alexander B. McKechnie, Thayer Francis and Frank G. Bell, Jr.

Payne, Stephen H., New York, Booth 441

(Third Floor)

Exhibits combustion appliances. The company is represented by Stephen H. Payne and Howard L. Cole.

The Permutit Co., New York City. Booths 480, 481

(Third Floor)

This exhibit consists of photographs, blueprints, drawings and demonstrating outfits of the "Permutit" water softeners and filters. The demonstrators are small ones such as those carried by the company's salesmen. The photographs, drawings, etc., illustrate all types and sizes of commercial water softening and filtering apparatus. The demonstrating softeners exhibited are constructed in such a manner that hard water may be introduced at one end and soft, zero water, containing no hardness, delivered almost instantaneously at the other end. The action is identical with that of the company's large commercial softeners and enables the prospective purchaser to see for himself how the system works and even make his own tests for hardness of the water. Representatives who will be in attendance during the exposition are A. T. Smith, manager of sales; R. W. Epple, assistant manager of sales; M. F. Corin, Philadelphia representative, and J. S. Shedden and C. L. Boyd, New Jersey representatives.

Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., Booth 33

(Main Floor)

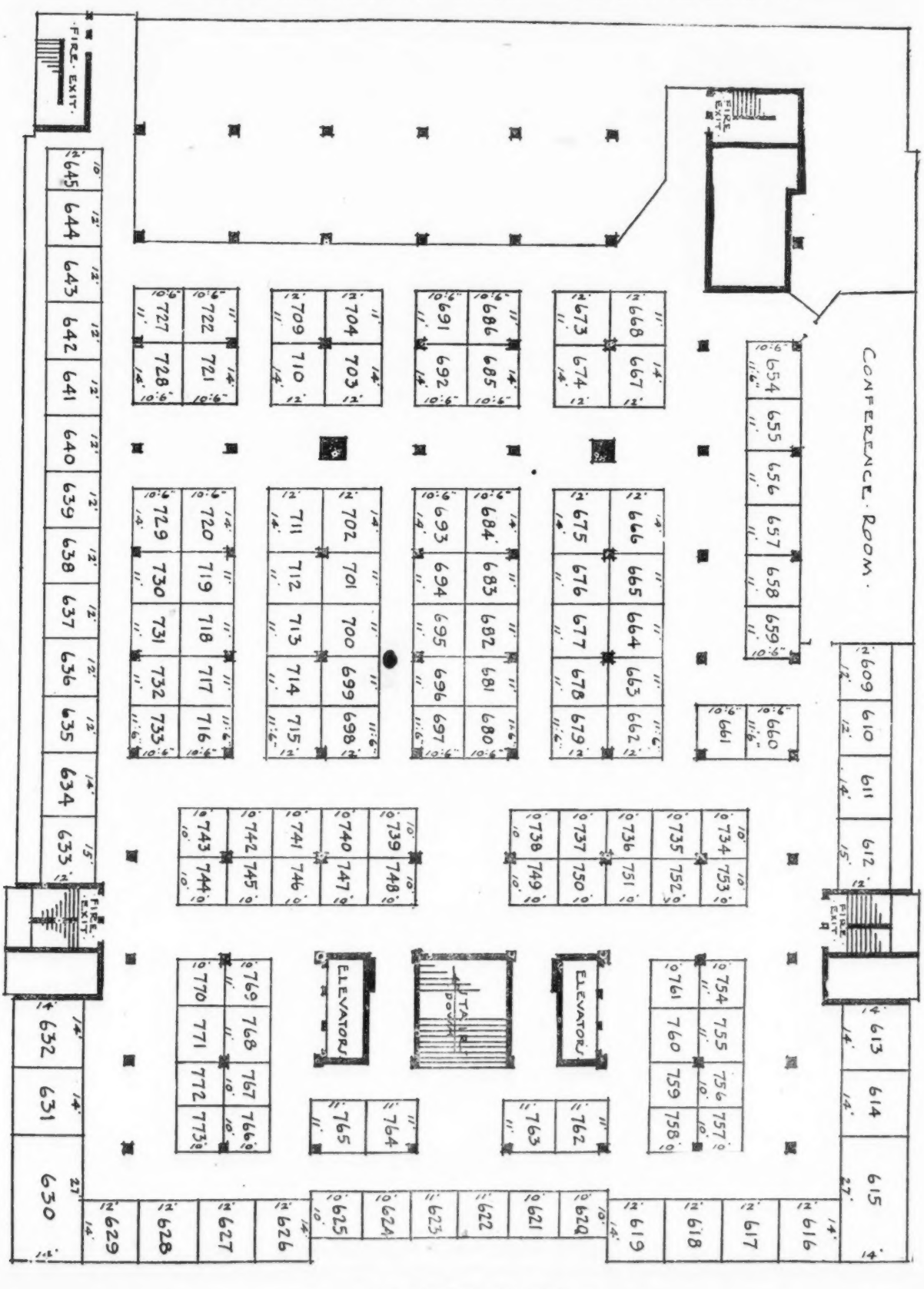
displays a full line of high grade, heavy chemicals such as acids, alums, alumina, lye, purple ore, gas purifiers, sodas, sulphate of alumina, chloride of lime, liquid chlorine and Greenland kryolith. A feature of the exhibit is samples showing the highest grade of heavy chemicals that can be produced commercially. Representatives are Messrs. Hutchinson and James, also representatives from all departments of the company will be in periodical attendance.

Perry & Webster, Inc. (formerly the Kalbperry Co.) New York City. Booth 568

(Third Floor)

consulting and designing engineers who display photographs of multi-story stackless varnish plants and data of interest to varnish manufacturers. Among the services rendered by the company are:—

FOURTH FLOOR BOOTHS' ARRANGEMENT



INNIS, SPEIDEN & CO.

ESTABLISHED 1816

Manufacturers, Importers and Exporters

of Industrial Chemicals, Colors, Etc.

MAIN OFFICE:

46 Cliff Street, New York, N. Y.

BRANCH OFFICES:

Chicago Philadelphia Boston Gloversville, N. Y. Cleveland

FACTORIES:

Niagara Falls, N. Y. Jersey City, N. J. Murphysboro, Ill.

SOLE SELLING AGENTS:

Isco Chemical Co., Niagara Falls, *Manufacturers of Chlorine Products, Caustic Soda, Etc.*
Isco Bautz Co., Murphysboro, Ill., *Manufacturers of Decomposed Silica*
Sheffield By-Products Co., *Manufacturers of Casein, Milk Sugar, Etc.*
Carpenter Cheese Co., *Manufacturers of Casein, Milk Sugar, Etc.*
And various other American Manufacturers

PRODUCTS:

ACIDS
- Arsenic
- Boric
- Citric
- Formic
- Oxalic
- Phosphoric
- Tannic
- Tartaric

ACETYLENE
- Tetrachloride

ALUM
- Alum Chrome

ALBUMEN
- Milk
- Egg and Blood

ALKALIS

AMMONIA
- Chloride
- Carbonate

ANILINE
- Oil
- Salts

ANTIMONY
- Needle
- Oxide
- Salts
- Sulphuret

ARCHIL

BARIUM
- Carbonate
- Chloride
- Fluoride
- Hydrate
- Nitrate
- Peroxide
- Sulphate
  - Pulp and Powder

BLEACH

BORAX

CARBON
- Tetrachloride
- Decolorizing

CASEIN

COPPER
- Sulphate
- Carbonate
- Oxide

DYESTUFFS

ELECTROPLATING MATERIALS

FORMATES

GUMS

IRON PERCHLORIDE

LEATHER FINISHES AND SEASONS

LITHOPONE

MOSS
- Sea

MAGNESITE
- Crude
- Calcined

MAGNESIUM
- Carbonate
- Chloride
- Sulphate

MANGANESE
- Oxide
- Monochrome

NICKEL
- Salts

POTASH
- Bicarbonate
- Bichromate
- Carbonate
- Caustic
- Chlorate
- Chloride
- Ferricyanide
- Ferrocyanide
- Metabisulphite
- Permanganate

POTATO
- Flour

SILICA
- Soft

SODA
- Ash
- Acetate
- Bichromate
- Caustic
- Chlorate
- Ferrocyanide
- Fluoride
- Laundry
- Nitrate
- Nitrite

SODA
- Silica Fluoride
- Sulphate
  - (Crystallized and in Powders)
- Sulphide

STARCH
- Potato
- Tapicoa

SUGAR
- Milk

SULPHUR
- Chloride

TALC

TIN
- Oxide

TURMERIC

ZINC
- Chloride
- Dust
- Oxide
- Sulphate

vestigation of process problems and onomies, and utilization of wastes; de- n and supervision of plant and appa- s for technical manufacture of chem- als; metallurgical products and pig- ents, paints and varnish; confidential vestigations and reports for executives, nking and financial interests; licenses d designs for apparatus for concen- ting, evaporating, drying, fume re- very and stackless varnish plants; li- nses, designs and process data for lphberry concentrating towers for sul- uric acid and other concentrations and ent acid recoveries; licenses and de- ns for leak proof all-masonry con- ruction for Glover, Gay Lussac and emical treatment towers and similar paratus. Representatives at the booth e R. S. Perry, president; R. W. Web- er, vice-president and V. K. Boynton, ief engineer.

Leonard Peterson & Co., Chicago, Ill., Booth 519

(Third Floor)

xhibits a full line of laboratory furni- ture.

The Pfaudler Co., Rochester, N. Y. Booth 73

(Main Floor)

Display consists of glass lined steel equip- ment for general use in the chemical industries. Representatives are R. B. Kil- bur, I. E. Colvin, W. E. Foster, R. L. Jacobs and J. A. Cowles.

Philadelphia Drying Machinery Co., Philadelphia, Pa. Booths 289, 290

(Mezzanine)

exhibits models of tray and truck dryers. A feature of this company's display con- sists of the methods demonstrated for drying various kinds of material. B. P. Webster and C. H. Renmann will be in charge of the exhibit.

Philadelphia Quartz Co., Philadelphia, Pa., Booth 500

(Third Floor)

Exhibit consists of the various forms of silicate of soda manufactured by this company. A feature of the display is a demonstration of the relative differences in composition of silicate of soda and a general description of the application of each of the various grades to specific uses. Representatives are J. P. Elkinton, sales manager; J. D. Carter, chemical repre- sentative, and R. C. Brown, W. H. Bux- ton, C. P. Wolcott, George W. Waite, G. Allen Brown and A. W. Moore.

Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass., Booth 730

(Fourth Floor)

Display consists of packages put up by means of this concern's various types of packaging machinery, showing the range of sizes and the different commodities that can be handled. On Monday eve- ning, September 20, gives a motion pic- ture feature, entitled "Modern Packag- ing Methods," at which time actual in- stallations of the company's equipment in many parts of the United States will be shown in operation. On Wednesday afternoon Everett W. Morgan gives an address, entitled, "Steel Collapsible Con- tainer as Related to the Chemical In- dustry." Demonstrations of steel collap- sible shipping cases will be given at this booth during the convention.

Pneumercator Co., Inc., New York City, Booths 415, 416 and 417

(Third Floor)

Many types of instruments for the indi- cation of depth, volume, weight and spe- cific gravity of liquid and semi-liquid fluids comprise the exhibit of this com- pany. In addition it is showing a line of mercury pressure and vacuum gauges formerly manufactured by the Parks En- gineering Co. of Philadelphia, the latter company having recently been acquired by the Pneumercator Co. The represen- tatives of the company at the booth will include Harry S. Parks, William Thomas and H. E. McManus.

Power Specialty Co., New York City. Booths 698, 699

(Fourth Floor)

Exhibit relates to fuel economy. Foster superheaters for steam, air, oil and chem- ical gas liquids. Special emphasis is placed on the development of superheated steam in the chemical industry, and various data are available showing the many uses to which it has been put in a great many of the largest chemical corporations in the country.

Powers Regulator Co., New York City. Booth 659.

(Fourth Floor)

displays a complete line of automatic temperature control as used in school buildings, institutions and the better class of residences; also apparatus and special- ties used in industry, such as complete control of an entire plant for both tem- perature and humidity; regulators for hot water tanks, dyeing and bleaching machines, steam cookers, acid baths, water cooling tanks, dry kilns, warming ovens, glue heaters, leather dryers, steril- izers, paraffin, grease tanks, etc.

Procter & Gamble Distributing Co., Cincinnati, Ohio, Booth 640.

(Fourth Floor)

exhibits a complete line of industrial and textile soaps, glycerine, red oil, stearic acid, pichene, etc. Booth is in charge of John R. Cochrane, T. E. Waters, W. G. Werner and H. T. Minor.

Powhatan Mining Co., Baltimore, Md. Booth 744

(Fourth Floor)

Features Powminco asbestos filter fibre, demonstrating the uses in the laboratory. The various stages of preparation are shown from crude to technically pure fibre. Among the varieties exhibited are Artinolite and Tremolite asbestos filters. Fred A. Mett is in charge of the booth.

Precision Instrument Co., Newark, N. J. Booth 80

(Main Floor)

exhibits boiler and gas plant specialties, featuring CO_2 recorders, calorgraphs, gravitometers, gas meters and gauges in operation. Representatives are Messrs. Hooper, Tilghman, Rack and Vorce.

Proctor & Schwartz, Inc., Philadelphia, Pa., Booths 234, 235, 236

(Mezzanine)

displays Proctor laboratory dryers and models of the Proctor 3 con. dryer for cotton, wool, etc.; also a Proctor 4 truck dryer for chemicals, colors, etc. A pro- jectoscope shows views of installation of Proctor dryers in all lines of manufac- ture. Samples of materials dried in Proc- tor dryers form a part of the exhibit. A feature of the display is formed by the machines in operation. The company is represented at the convention by E. B. Ayres, H. S. Landell, D. D. Hollenbaugh, Mrs. A. E. Reiter, S. Rhoads, C. W. Schwartz 3d, and E. A. Hults.

Provost Engineering Corporation, New York City. Booth 78

(Main Floor)

shows a comprehensive line of mixers and filter presses. A prominent feature of the exhibit is an improved type of mixer with a new form of agitator. In attend- ance at the booth are Mr. Kleinfeldt, C. A. Beach, A. T. Beach and H. C. Russ.

Pyrolectric Instrument Co., Trenton, N. J. Booth 288

(Mezzanine)

exhibits pyrometers and electrical preci- sion instruments. A prominent part of the display consists of a new type of simplified apparatus for the determina- tion of hydrogen in concentrations. This includes the recently developed PH type Northrup pyrovoltmeter and the Elliott- Acra apparatus made available by the Grahame Chemical Co., Rochester, N. Y. W. C. Harter and H. L. Saums are in charge.

Q

Quigley Furnace Specialties Co., New York City. Booths 539, 540

(Third Floor)

Among the materials displayed are the following:—Hytempite, a high tempera- ture refractory cement for bonding fire- brick and granular refractory materials; Carbosand a highly refractory fire sand for use in making furnace linings; Insul- brix, a specially prepared cellular refrac- tory brick for insulating furnace walls. Heat-treating equipment shown includes carbonizing and annealing boxes and cya- nide chloride and lead pots Q-alloy and Q-steel. The Quigley system for the prep- aration, distribution and burning of pow- dered coal in boilers and furnaces is fea- tured. Representatives in attendance are W. S. Quigley, president; H. A. Kimber, vice-president; J. H. McFadden, secre- tary; F. W. Reisman, sales manager; W. O. Renkin, H. H. Harris, P. F. McGovern and C. Gantzman.

R

Raritan Aniline Works, New York City, Booth 665

(Fourth Floor)

Aniline oil. In charge of exhibit:—W. H. Van Winckel, H. D. Wellman and A. B. Hamby.

Raritan Copper Works, Perth Amboy N. J. Booth 6

(Main Floor)

At this booth the electrolytic refining of copper is completely illstrated and a full display made of the many by-products obtained, such as gold, silver, selenium, tellurium, nickel sulphate and copper sulphate. With the co-operation of vari- ous coppersmiths and manufacturers the company has been enabled to present a special exhibit illustrating the uses of copper in the industrial arts. S. Skow- ronski will be in charge of the exhibit.

Raymond Bros. Impact Pulverizer Co., Chicago, Ill. Booth 49

(First Floor)

displays models representative of the company's grinding machinery equipped with air separation for pulverizing mate- rials to a fine powder. The models are in actual operation reducing a repre- sentative material to a uniform powder. Representatives in attendance are E. M. Lauritzen, vice-president, and W. M. Cook, Joe Criter, F. E. Raymond, S. B. Kanowitz.

Research Corporation, New York City. Booth 4

(Main Floor)

Exhibit consists of a demonstration of the Colltrell electrical precipitation processes for the recovery of lamp black, cleaning of producer gas, blast furnace gas, re- covery of metallurgical losses, recovery of acid mist and recovery of phosphoric acid, soda and numerous other materials that are now being carried away in waste gases from industrial plants.

Refinite Co., Omaha, Neb. Booth 464

(Third Floor)

features a complete miniature working model of the Refinite water softener. In charge of the demonstrations are L. R. Whitcomb, J. F. Greenfield and C. M. Dunn.

Republic Flow Meters Co., Chicago, Ill. Booth 512

displays Republic flow meters for measur- ing steam, water, air and gas; also Re- public low differential gas meters, CO_2 recorders, Gebhardt portable indicating steam meters and Pitot tubes and orifices. Thomas A. Curran and George Hendrick- son are in charge.

Revolvator Co., Jersey City, N. J. Booths 258, 259

(Mezzanine)

exhibits a full line of combination hand- power and motor driven portable elevators and tiering machines. The com- pany's machine may be used as a hand- power or it may be used as a motor- driven, by simply shifting a lever. It takes the power from any ordinary elec- tric light socket, so that it does not re- quire special wiring.

Dwight P. Robinson & Co., New York City, Booth 426

(Third Floor)

Exhibit consists of photographs of chem- ical plants designed and built by the com- pany. Engineers will be in constant at- tendance to meet chemical engineers and executives interested in chemical plant construction.

Roessler & Hasslacher Chemical Co., New York City, Booths 264, 265, 266

(Mezzanine)

The principal exhibit consists of the com- pany's own special products, such as chloroform, cyanide, metal cyanides, tris- alyts, formaldehyde, hexamethlyenetetra- mine, antimony salts, soda prussiate, me- tallic sodium and sodium peroxide, sup- plemented by a general line of chemicals of their own manufacture. The special feature of this exhibit will be methyl chloride, the production of which has been developed recently by this company. The exhibits will be in charge of Herbert Gillis, assisted by several works mana- gers and salesmen qualified to give tech- nical and commercial information con- cerning the special exhibits.

Rollin Chemical Corp., New York City. Booths 292, 293

(Mezzanine)

Barium, Sodium and Chlorine products. In charge of exhibit:—J. G. Harrison.

Ruggles-Coles Engineering Co., New York City. Booth 83

(Main Floor)

displays a complete working model of a double shell dryer, photographs, etc. Rep- resentatives in charge are Francis E. Finch, vice-president; James K. Towers, from New York office, and Walter H. Glomb, from Engineering Department, York, Pa.

S

Sarco Co., New York City. Booth 504

(Third Floor)

shows steam trap, radiator trap, CO_2 re- corder and recording gas calorimeter. There is a temperature regulator operat- ing under actual conditions and other devices in operation. The company is rep- resented by E. J. Ritchie and G. W. Ber- gen.

Schaar & Co., Chicago, Ill. Booths 502, 503

(Third Floor)

displays laboratory apparatus, including balances, glassware, etc. A feature of the exhibit are the analytical balances made in the company's own shops, and other American-made apparatus. Adolph E. Schaar and E. W. Ohman are the repre- sentatives.

Schaeffer & Budenberg, Brooklyn, N. Y. Booth 65

(Main Floor)

Recording thermometers and gauges; a new type of thermometer not hitherto shown. In charge of exhibit:—H. V. Carlier, F. Undeutsch and A. Campbell.

Schwartz Sectional System, Indianapolis, Ind. Booth 431

(Third Floor)

shows sectional filing cabinets for chem- icals, reagents, samples and specimens. The exhibit is in charge of M. P. Schwartz.

Scientific Equipment Co., New York City. Booths 496, 497 and 498

(Third Floor)

shows all sorts of laboratory furniture and laboratory apparatus. The company is represented at the exposition by J. M. Roberts, S. L. Redman and A. B. Carter, of Chicago; Charles G. Campbell, of Ke- wanee, Wis.; and O. T. Louis, R. S. Blod- gett and Charles Ress, of New York.

Scott & Co., Ernest, Fall River, Mass., Booth 316

(Mezzanine)

exhibits a small model of a vacuum evapo- rator. There are also shown samples of materials produced by the company's ap- paratus, including glycerine oils, etc.; and photographs of installations of ma- chinery for the recovery of waste prod- ucts in practically all chemical trades. The company is represented by H. A. Austin, R. W. MacGregor and C. E. Bradley.

Henry L. Scott & Co., Providence, R. I. Booth 731

(Fourth Floor)

Exhibit consists of two testing machines for general work in testing strength and elasticity of various materials.

Seydel Manufacturing Co., Jersey City, N. J. Booths 271, 272

(Mezzanine)

exhibits benzoic acid and other products of the company and products—both food and medicinal—in which benzoates are used. The company is represented by Edmund E. Smith, sales manager of the chemical division.

Sharples Specialty Co., Philadelphia, Pa. Booth 94

(Main Floor)

exhibits a motor-driven laboratory super- centrifuge and acid-proof commercial super-centrifuges. The company is rep- resented by Max B. Miller, Homer Clou- key, Aldus Wilbur, F. W. Wilbur and Bert Bower.

Seymour & Peck Co., Chicago, Ill., Booth 507

(Third Floor)

exhibits wooden shipping drums. C. B. Arnold represents the company at the ex- position.

Shawinigan Electro Metals Co., Montreal, Can. Booths 471, 472

(Third Floor)

shows products of the company, including carbide of calcium, acetic acid, acetalde- hyde, paraldehyde and aldehye. There is a display of lantern slides showing views of the company's plant. H. E. Mussett, J. C. Fruitt and Henry Booth represent the company at the exposition.

Sidio Co. of America, Inc., New York City. Booth 39

(Main Floor)

Complete line of fused silica ware made in America, for laboratory and industrial purposes. In charge of exhibit:—Fran- cis H. Ruhe, Walter J. Fensterer and G. H. Mueller.

Simmons Co., John, New York City. Booth 693

(Fourth Floor)

shows automatic gravity scales, steam traps and valves. The company is rep- resented by R. E. Thomas, Benedict Wells and C. J. Quinn.

W. W. Sly Manufacturing Co., Cleveland, O., Booths 709, 710

(Fourth Floor)

has on exhibition a model dust arrester and pneumatic separator. These are in full operation to demonstrate their value in connection with separating the coarse and fine materials by air suction and for collecting the finest dust.

Solvay Process Co., Solvay, N. Y. Booth 16

(Main Floor)

shows products of the company, including caustic soda, soda, ash, sodium bicarbon- ate, modified sodas, calcium chloride, salt and other chemicals. There is a view of the layout of the company's plant, show- ing the flow of materials through the plant. Edwin C. Scott is in charge of the exhibit. He is assisted by C. A. Cole, James Cooper, W H. C. Grimes and M. H. Kramer.

Southern Cotton Oil Co., New York City. Booth 632

(Fourth Floor)

Exhibit consists of by-products of cotton- seed in the form of fatty acids which are generally used in the lubricating oil and soap trade for the manufacture of lubri- cating greases and soaps. Also exhibits cottonseed pitch, which is derived from cottonseed soap stock, and which is used in the manufacture of paints, roofing ma- terials, linoleum and by the lubricating oil trade. Those who are in attendance at this booth are David Wesson, W. E. Fackert, Philip Brendel and C. J. Drewes.

Sowers Manufacturing Co., Buffalo, N. Y. Booth 72

(Main Floor)

exhibits three DOPP seamless steam jack- eted mixing kettles equipped with differ- ent style agitators; one four hundred gallon DOPP seamless jacketed kettle ar- ranged for oil heating; one ten gallon DOPP laboratory vacuum pan; and other of the company's products. R. C. Bog- gess is in charge of the exhibit.

Southern Railway System, Washington, D. C., Booths 629, 630

(Fourth Floor)

Minerals, both metallic and non-metallic, which are found in the territory served by the railroad lines and available for industry constitute the principal features of the exhibit by the Southern. In addi- tion there will be a large display of finished products made in manufactories served by the road. Arthur D. Little, Inc., of Cambridge, Mass., assisted the road in preparing the exhibition. Those representing the railroad include William C. Olds, general industrial agent; Chester G. Gilbert, economic geologist, and Rob- ert F. LaBarron, chemist and engineer.

Stein, Hall & Co., Inc., New York City. Booths 211, 212

(Second Floor)

shows different varieties of starch and starch products, such as gums, dextrine, etc. The exhibit is in charge of Lewis W. Peabody.

Herman H. Sticht & Co., New York City. Booth 610

(Fourth Floor)

shows the instruments of the Cleveland Instrument Co. and the Bacharach In- dustrial Instrument Co.; also indicating and recording pyrometers for all temper- atures ranging from 250 deg. below zero to 3000 deg. Fahrenheit. Some of these are shown in actual operation. One in- strument records the outside temperature and the temperature in various parts of the exposition room. Shown in actual operation are indicating and recording in- struments for the measurement of gases, also draft recorders, CO_2 indicators, tach- ometers and laboratory rheostats.

Stimpson Equipment Co., Salt Lake City, Utah. Booths 557, 558

(Third Floor)

Mitchell electric vibrating screen and miniature Janney flotation machine. In charge of exhibit:—C. W. Stimpson, J. E. Klein and J. A. Lane.

F. J. Stokes Machinery Co., Philadelphia, Pa. Booths 85, 86

(First Floor)

shows a rotary tablet machine in opera- tion making naphthalene balls, a rotary tablet dryer, powder filling machine, au- tomatic water stills, copper vacuum still.

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CHICAGO, ILL.

surface condensor and other machines made by the company. L. H. Bally and Charles T. Coleman represent the company.

Sturtevant Mill Co., Boston, Mass., Booths 30, 31

(Third Floor)

shows machinery for crushing, grinding, pulverizing, screening, mixing, elevating, etc. L. H. Sturtevant, H. A. Tomlinson and W. T. Doyle represent the company.

Sullivan Machinery Co., Chicago, Ill. Booths 459, 460

(Third Floor)

exhibits an operating model of its air lift pump. This shows the application of the air lift principle to pumping water from wells, and to handling acids and other chemical solutions from wells or collecting pits. Air lift pumps or foot pieces, another equipment made up in various material to resist the action of chemicals, are also shown. John Oliphant, manager of the pneumatic pumping department of this company, is in charge of the exhibit. He is assisted by L. R. Chadwick, sales manager of the New York city office, and L. E. Gilbert, pneumatic pumping engineer.

Swenson Evaporating Co., Chicago, Ill. Booth 64

(Main Floor)

show two experimental size evaporators. The company is represented by F. M. de Beers, P. B. Sadtler, G. Gordon Urquhart and P. H. Appell.

T

C. J. Tagliabue Manufacturing Co., Brooklyn, N. Y. Booths 275, 276

(Mezzanine)

shows Witham Controllers for automatically maintaining a uniform temperature in paper machine dryers; also the P. & W. condensate controller for removing the condensate and wet steam from drying machines; also the P. & W. liquid level controllers for evaporators. It is said for the condensate controller that it has replaced eight traps at a paper mill, and with better results, and for the P. & W. liquid level controller, that it will automatically maintain the level under vacuum or pressure conditions at the exact height required increasing the capacity of evaporators fully 10 per cent. The liquid level controller, it is pointed out, demonstrates that sort of efficiency in paper mills where caustic soda is recovered from evaporators. The company states that the Witham system of automatic temperature control operates on the only correct principle, viz., keeps the temperature of the dryers uniform by varying the steam pressure within the manifold. Messrs. White, Dooling, Traundt, Dougherty and Wichum will be in attendance.

Takamine Laboratory, Inc., New York City, Booths 762, 763

(Fourth Floor)

Displays at its double booth a line of commodities manufactured or distributed by the company. These include neo-arsaminol, arsaminol, Mer-Po-Sal merpot-ide, borotetramine, tuyol, hirathiol, Takamine protein feed, taquinine, polyzime, taka-rise. In addition there is a long list of specifics for the treatment of disease, pharmaceuticals, baking, laundering and manufacturing chemical specialties. In charge of the booth are:—Jokidil Takamine, Jr., D. O'Gorman, Charles M. Tanner, J. E. McHenry and Miss A. L. George.

Charles S. Tanner Co., Providence, R. I. Booth 762

(Fourth Floor)

exhibits Polyzine, a de-gumming and desizing extract, for which the company is sole agent for the Takamine Laboratory, Inc., which shares the booth. C. Milton Turner, vice-president, and W. S. Newell, of the Charles S. Tanner Co., will have charge.

Taylor Instrument Companies, Rochester, N. Y. Booths 248, 249

(Mezzanine)

Temperature measuring and controlling instruments are exhibited by this prominent enterprise. An interesting exhibit is the one showing the development of indicating, recording and regulating instruments. Those at the booths to demonstrate will be:—T. C. Hazard, A. J. Wagner, J. P. Gilmore, H. W. Kugler, F. E. Ely, E. C. and F. K. Taylor and E. N. Hurlburt.

Texas Gulf Sulphur Co., New York City. Booths 747, 748

(Fourth Floor)

In charge of exhibit:—A. S. Cosler.

Textile Colorist, Philadelphia, Pa. Booth 514

(Third Floor)

This publication has on file bound volumes of its issues from 1879 to the current issue. In addition there is a library of the latest informative books on dyeing, bleaching, printing and finishing of all textile fibres and fabrics. Emil Frank, manager, is in charge, assisted by S. S. Henderson, S. M. Waream and H. S. Nieman.

Textiles, Boston, Booth 477

(Third Floor)

This publication will use its booth as a distributing point for sample copies of the paper and will have displayed in addition some of the hand books which are published by the same firm.

Thermal Syndicate, Ltd., New York City. Booth 57

(Main Floor)

A feature is the Vitreosil (fused pure silica) equipment for acid concentration, cooling and condensation. Others will be a glazed Vitreosil laboratory apparatus, and transparent Vitreosil tubing and utensils. W. W. Winship, S. L. Tyler and W. E. Strevig are in attendance.

Thermo Electric Instrument Co., Newark, N. J. Booths 230, 231, 232

(Mezzanine)

gives space to constant temperature ovens, incubators and water baths, among other articles. An automatic constant temperature control is featured. There is also given a degree of prominence to Frens ovens, incubators and other Frens apparatuses. Royal B. Freas, Joseph La Mar and Edwin G. Price are at the booths.

Arthur H. Thomas Co., Philadelphia, Pa. Booths 527, 528

(Third Floor)

The Kelly Electrometric Titration Outfit, Newton and Troemner Balances and apparatuses for the measurement of differences of potential by the Potentiometer method are shown. Also, detemination of the H-ion concentration in solutions, and for the measurement of electrolytic conductivities; refractometers, polariscopes, Pellin polarometers, saccharometers, electric ovens, Edwards gas density balance, combustion trains, colorimeters, and other laboratory supplies. The Kelly Electrometric apparatus and the Newton and Troemner Analytical Balances form a special exhibit.

R. M. Miller, sales manager; H. C. Roak, his assistant, and C. C. Roberts, technician, are present at the booths.

Thwing Instrument Co., Philadelphia, Pa. Booth 40

(Main Floor)

Temperature recording and indicating apparatus and new paper testing instruments comprise this year's offering of Thwing, which is in charge of Dr. C. B. Thwing, assisted by Messrs. E. J. Albert, H. K. Walton, J. H. Terrey and A. S. Hall.

Titanium Pigment Co., Niagara Falls, N. Y. Booths 262, 263

(Mezzanine)

Company exhibits Titanox pigments, and various supplies of paint, enamels, rubber, oil cloth, wall paper, printing ink, etc., in which they are used. L. E. Barton and C. J. Kinzie represent the company.

Tolhurst Machine Works, Troy, N. Y. Booths 68, 69

(Main Floor)

A 40-inch suspended centrifugal is shown in operation, driven by a motor. The design embodies new features in centrifugal work. All centrifugals shown are constructed for use in the chemical industries. The products exhibited are one of each of the following:—40-inch suspended centrifugal, 48-inch center-slung centrifugal 40-inch self-balancing centrifugal, 20-inch solid curb centrifugal, 12-inch laboratory centrifugal.

Those at the booths are:—W. C. Dutton, vice-president; R. K. Cheney, sales manager; John S. Gage, Western representative; T. M. Stuart, Eastern; T. A. Bryson, chief engineer; B. M. Pilhasby, San Francisco.

W. S. Tyler Co., Cleveland, Ohio, Booths 721, 728

(Fourth Floor)

exhibits Hum-mer inclined screen, Rotex testing sieve shaker and Tyler wire cloth.

U

Uehling Instrument Co., New York City. Booth 45

(Main Floor)

Among the boiler room equipments shown are Uehling CO_2 recording equipment for analyzing boiler furnace flue gases continuously, thus enabling operators to keep tabs on heat wasted, with a view to decreasing waste. It is used for various chemical processes for determining percentage of carbon dioxide, continuously. F. F. Uehling, C. J. Schmid, C. C. Phelps and W. J Reilly are at the booth.

United Filters Corp., New York City. Booth 53

(Main Floor)

Working model of an American filter; Sweetland and United filter presses and samples of filter press plates and cloths.

United Lead Co., New York City, Booth 70

(Main Floor)

The chemical lead lined pipes, fittings, valves, chemical lead lined apparatus, etc., of this company compose an instructive presentation of first class equipment.

The United centrifugal acid pumps are given a preferencial showing in the booth. C. B. Holden, assistant manager, is in charge, assisted by J. W. Spotten, George H. Checkley, C. R. Andrews, H. F. Freiherr and H. F. Hemple.

United States Cast Iron Pipe & Foundry Co., Burlington, N. J. Booth 76

(Main Floor)

A condensor is shown, illustrating the salient features of the company's barometric counter-current condensor, including method of water distribution to expose the maximum surface for heat transfer with a minimum of frictional resistance to the flow of steam; also, method of air removal to obtain greatest efficiency of operation.

Also, samples of casting work for chemical sugar industries, and cast iron pipe, a sectional 12-foot length of flanged pipe, showing method of casting vertically without chaplets and making it possible for removing impurities of the iron by removal to a shrink head which is cut off. H. A. Hoffer is in charge, assisted by J. D. Capron and C. D. Donaldson.

U. S. Industrial Alcohol Co., New York City. Booths 300, 305

(Mezzanine)

Commodities shown at these booths include:—ethyl alcohol, C. P. methyl alcohol, 95@97 per cent. refined; pure methyl alcohol, denatured grades of wood alcohol, commercial acetone, Calcitone and methyl acetone, completely denatured alcohol, all formulæ; Pyro alcohol, and specially denatured alcohol, all formulæ. Samples of products in the various stages of manufacture are shown, beginning with the crude molasses to the pure alcohol. Charts showing uses of alcohol are distributed. B. R. Tunison is in charge.

U. S. Smelting Furnace Co., Belleville, Ill., Booth 461

(Third Floor)

This company has an interesting exhibit. It is the U. S. rotary melting furnace, which is used for melting brass, bronze, aluminum and for smelting and refining work, and for melting vitreous enamels. Capacities of furnaces, 200, 400, 1,000 and 2,000 pounds. H. W. Longfelder and Walt Marsh are in charge.

U. S. Industrial Chemical Co., New York City. Booths 300 and 305

(Mezzanine)

shows the following commodities, which it produces:—Isobutyl alcohol, refined fusel oil, amyl alcohol, methyl acetate, amylacetate, acetic ether, ethyl acetate (commercial), normal propyl alcohol, ethyl acetoacetate (acetoacetic ester), and potash materials. At the booths can be seen photographs of portions of the company's plant illustrating some of the manufacturing processes. B. R. Tunison is in charge.

Union Steam Pump Co., Battle Creek, Mich. Booths 237, 238, 239, 240

(Mezzanine)

Complete pumping equipment for the chemical industry, vacuum and pressure pumps, steam, belt and motor driven. In charge of exhibit:—R. W. Friedman, E. P. Ordway and K. D. Smith.

Union Sulphur Co., New York City. Booth 418

(Third Floor)

V

Valley Iron Works, Williamsport, Pa. Booths 436, 437

(Third Floor)

This exhibit includes several types and sizes of small autoclaves and sulphonators suitable for laboratory and semi-commercial work. Messrs. Senior, Mills and Jacobs are the company's representatives at the booths.

W. H. Van Winckel, New York City. Booths 664, 665 and 666

(Fourth Floor)

At these booths the following companies and products are represented: — Nitro Products Corporation, H. Acid. Raritan Analine Works, analine oil, oil of myrabane, nitrobenzol. Uniform Chemical Products, benzidine base dry paste, benzidine sulphate. T. M. & G. Chemical Co., diethylaniline, ethylbenzylaniline and monoethylaniline. Representatives at the booths are:—Mr. Van Winckel, H. D. Wellman, J. B. Pitcher, W. B. Whittemore, Clifford S. Cooley and H. B. Hamby.

Vitreous Enameling Co., Cleveland, O. Booth 343

(Mezzanine)

Company has on display vitreous enameled pans and trays for vacuum, tunnel and shelf dryers, which have found wide acceptance. Edgar H. Weil, secretary, and Harry Warman, sales manager, are in charge of the booth.

W

Wailes Dove-Hermiston Corp., New York City, Booth 676

(Fourth Floor)

Will show a complete line of bitumastic and hermastic coatings made by the company for the protection of various materials against moisture, acids, alkalies, brine, fumes and other corrosive agents. The display will especially demonstrate the uses to which these coatings have been applied in the chemical and allied trades. R. B. Nisbet, H. W. Cronk and W. T. Chevalier will be at the booth.

Wallace & Tiernan Co., Inc., New York City. Booth 225

(Mezzanine)

This company is showing special chlorine control apparatus for use in the bleaching of paper and textiles, also for deodorization purposes, for oxidation, separation of metals and other chemical operations. A control apparatus for the sterilization of water supplies, sanitation of swimming pools and disinfection of sewage. A line of gauges, special valves and flow meters for handling chlorine is also displayed. The booth is in charge of M. F. Tiernan, William J. Orchard, L. H. Goebel, R. V. Donnelly and H. D. Thompson.

Ware Bros. Co., Philadelphia, Pa. Booth 743

(Fourth Floor)

This company is offering its two publications "The American Fertilizer" and the "American Fertilizer Handbook." The booth is in charge of A. A. Ware, S. Reid Warren, H. W. Ferkler, B. Hevenor, Robert T. Lore and A. E. Zintl.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Booth 46

(Main Floor)

Display consists of A. C. and D. C. specially impregnated motors, arc furnace regulating and control panels, industrial heating appliances, starting switches, control switches and a full line of electrical devices for use in the chemical industry. The feature of the display is the arc furnace regulating and control panels. C. B. Gibson, manager of the mining and electrochemical section; C. G. Schlueder-berg, supply department, and G. H. Gaspert, publicity department, are handling the display for the company.

Wedge Mechanical Furnace Co., Philadelphia, Booth 33

(Main Floor)

Featuring this company's exhibit will be a model of the Wedge roasting furnace produced by it. Parts and appliances will also be shown in an attractive and instructive manner. Keslie H. Webb, secretary of the company, will be in charge of the exhibit.

C. H. Wheeler Manufacturing Co., Philadelphia, Pa. Booths 654, 655

(Fourth Floor)

exhibits the following euipment: — A model showing the inside of the Radojet air pump; a double stage Radojet air pump; a double stage Radojet air pump with inter-condensor; a single stage Radojet air pump; a duplex condensate pump; an automatic steam pressure regulator; and an automatic temperature regulator. In charge of the exhibit is Charles Lang, New York district manager.

Whitall-Tatum Co., New York City. Booths 334, 335

(Mezzanine)

Company is showing a complete line of its "Nonsol" chemical glassware displayed in a manner to illustrate the particular advantages of each piece of apparatus. W. W. Figgis, sales manager of the company, assisted by a corps of competent men, is in attendance at the exhibit.

Jacques Wolf & Co., Passaic, N. J., Booths 766, 767

(Fourth Floor)

shows a line of specialties for the textile trade. The products consist of sulphonated oils, softeners and finishing preparations. Since the outbreak of the war the company has completed the manufacture of hydrosulphites, of which samples are shown. The feature of the display is the exhibit of materials upon which the various products of the company have been used, showing the actual results of the operations. Dr. Alfred Pfister, president and treasurer of the company; Walter D. Beuble, James W. Goss, Frederick R. Henckel, Robert S. Griffith, John F. McDonagh, Albert J. Royce and G. J. Desmond are handling the display and explaining the various products of the company.

Z

Zapon Leather Cloth Co., New York City. Booth 12

(Main Floor.)

A display of artificial leather, featured by an extensive line of colors, grains and finishes of Zapon leather cloth and the processes by which it is produced is being shown by this company. W. C. Chapman, Walter Van Brook and G. Gurska are handling the display for the company.

POISON GAS VS. RATS

Dr. Baskerville Tells Chemists of New Form of Exterminating Rodents

The poison gas, phosgene, much used in the European War, can now be employed for killing rats and moles. The suggestion had been made that poison gases could be used for exterminating rodents and vermin, but there had been great difficulty that the human beings making use of these vapors be injured.

Dr. Charles Baskerville, of the College of the City of New York, at the American Chemical Society meeting in Chicago, reported this difficulty had been overcome through his finding fluids in which the phosgene could be dissolved. He told his fellow members of the Industrial Division of the American Chemical Society, in session this morning (Wednesday, Sept. 8th) at the University of Chicago, that gasoline, benzine, and ethylacetate would dissolve an equal weight of the poison gas at ordinary temperatures. These solutions exert practically no temperature beyond that of the air, so they may be transported with safety within ordinary closed containers. On exposure to the atmosphere, the liquid and dissolved gas evaporate. On warming these solutions in suitable vessels, the phosgene is set free and may be used in a pure form in the manufacture of certain coar tar products useful either as dyes or for medical purposes.

The irritating phosgene which had been manufactured to only a limited extent before the war now has a wider use for the purposes of peace.

"An impelling factor in causing the Germans to sign the armistice," he concluded, was a knowledge of the rapid development of the stupendous poison programme of the United States. One unfamiliar with the actual quantities produced and the rate of the production would have had difficulty in grasping the full meaning, but its significance was sufficient to the enemy. One of the earliest gases, a real gas, used before the Great War to be used in producing a limited number of organic compounds and for research purposes. Small amounts were exported to the United States prior to 1914. It was being produced in this country for similar uses after the blockade had shut off the importation of chemicals in the manufacture of which the Germans had made a specialty It was transported in small quantities liquefied in cylinders. When hostilities ceased we were producing the poison gas for war purposes at the rate of about fifty tons a day, with a programme nearly completed for a much larger production."

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PROPERLY BALANCING FUEL, LUBRICANT AND MOTOR

*By William F. Parish**

Dilution of motor lubricating oil has always existed; dilution is caused by the gasoline mixture escaping past the piston rings, with a possible secondary cause—drainage of the diluted oil from the cylinder walls.

In the earlier years of highly volatile gasoline the gas escaping past the piston rings did not enter extensively into the body of the lubricating oil, and while mechanical losses of fuel took place in all four cycle engines, this loss did not reflect itself in a problem of dilution. In the past few years, however, due to the heavy end components of the fuel, a larger amount after passing the rings, upon condensation, remained in the lubricating oil, thus creating a condition of dilution.

Not until the period of high end point gasoline did the matter of fuel loss become apparent, then only in proportion to the amount held in solution in the lubricating oil. This condition, which has become especially accentuated in the past three or four years, has resulted in undue wear upon the engine parts as well as affecting the use of fuel, lubricant and power.

The purpose of this paper is to call attention to this underlying trend in the situation and to suggest a method of application of motor oils to correct some of the present faults. It is felt that a true solution can be reached only in changes in mechanical equipment of the engine, and a plea is made for better engine design and greater economy in the use of gasoline and lubricating oils.

History

During 1911, in conducting research work in connection with the use of various fuels and lubricants on a four cylinder automotive engine and in examining the lubricating oils before and after use, it was noticed that the oil drawn from the crank case after use had undergone a considerable physical change, the most noticeable being that the viscosity of the oil had been lowered during use until it was only one-half or one-quarter as much as the viscosity of the new oil. The flash or ignition point of the used oil was only a third of the original, in some cases being lowered from 470° to 150° F. Other just as remarkable changes had taken place in the gravity and cold test of the oil.

The automotive engineers making the tests stated they had always noted a similar condition in the case of racing cars where, after a hard race, the oil upon being drawn from the engine was as thin as water even when it was cold.

Technical records were searched for similar information. The only reference regarding the lowering of the flash point and lowering of the body of the oil in automotive engines was found in an English paper, which stated that this condition had been noted, but that no solution had been found. The matter was then taken up with the most prominent automotive manufacturers, the condition explained to them, and they were asked if they had ever noticed the changes that had taken place in the lubricant in their engines, and practically the only answer was that all oil in these engines would wear out and become thin.

An article prepared by the author and published in June, 1912, ascribed the changed condition of the motor lubricant entirely to the leakage of gasoline vapor during the compression stroke, recondensation of this vapor in the crank case, absorption by the lubricant, and to a probable slight leakage down the walls of the cylinder, of unconsumed heavy portions of the fuel which had mingled with the lubricant, producing a similar effect. This has been a condition which has always existed, but which has become more pronounced and better understood during the past two years.

The tremendous growth of the automotive industry during the past few years, with the consequent burden placed upon the oil industry of producing the vast amount of fuel required, has brought about an unbalanced condition. Because of the enormous increase in consumption of gasoline—from 15,000,000 barrels in 1910 to approximately 95,000,000 barrels in 1919—the petroleum industry has been able to meet demands only by the manufacture of a less volatile fuel.

There is no reason to believe that this pressure will diminish, but on the contrary there is ample evidence to show that it will continue to increase. It follows, therefore, that gas engine designers must so design their engines as to successfully consume this product.

Navy Department specifications show that during the past few years automotive fuels have been gradually getting heavier, approximately from 360° F. end point in 1916 to 428° F. end point in 1919. The end point is the temperature at which the final part of the fuel vaporizes. The effect of even the lightest fuel on the lubricant and the after effect of the lubricant upon the engine have not been adequately described, and it is the intention of this paper to enter into a thorough discussion of this subject, for which purpose certain government records have been consulted.

Practical Laboratory Tests

During the war, it was necessary, before writing specifications for lubricating oils and fuels for aeronautic and other internal combustion engines, to make a complete study of this subject in order that the fuel and lubricants could be so balanced that their combination in the engine would give the necessary lubricating results. These main tests resulted in the specification for Liberty Aero Oil, and had much to do with specifications for aviation gasolines, including domestic, export and fighting grades. An Hall-Scott, type A-7-A, four cylinder, 100 H. P., aeronautic engine was used for the special fuel tests of the series. This engine was operated under ideal test conditions, working with the same lubricant but with different fuels. Two of these fuels were especially made for the test and were distilled from the same crude. The first fuel tested was made after the German specifications for aviation gasoline, and had a gravity of 75.2° Be., with initial boiling point of 110° F., and a final boiling point of 230° F. The second fuel tested was made after the French specifications and had a gravity of 63.6° Be., and an initial boiling point of 140° F., with a final boiling point of 292° F. The third fuel was regular navy specification motor boat fuel under contract for the year 1917, and had a gravity of 61.3° Be., with an initial boiling point of 135° F., and a final boiling point of 385° F. To the last fuel a so-called gasoline energizer was added which produced a fuel which, while it had an initial boiling point of 135° F., had an end point of 422° F., which in its last distillation range would be equivalent to the present day commercial gasoline.

The method of conducting the test was to run the engine continuously for five hours under test conditions, every observation in connection with the operation being recorded. At the end of every hour samples of lubricating oil were drained from the lubrication system of the engine and the same amount of new oil replaced. These samples were examined by a very efficient corps of oil chemists working at the Bureau of Standards; at the oil laboratory, Washington Navy Yard; at two commercial laboratories, and at the Naval Experiment Station at Annapolis. The effect of the four different classes of fuel upon the same lubricant is clearly registered in charts No. 1 and No. 2. The lightest or most volatile fuel shown in test No. 3 caused a lowering of the viscosity of the lubricating oil during the first hour of 30 seconds (viscosity Saybolt Universal Viscosimeter). The oil, however, recovered its body, and at the end of the fifth hour was 44 seconds above its original viscosity or body.

In test No. 2, with a slightly heavier fuel, there was a reduction in the body of the oil of 46 seconds during the first hour. The oil, however, after the first hour recovered and had a viscosity of 28 seconds above its original body at the end of the fifth hour.

Test No. 1 with a semi-commercial fuel showed a drop in the body of the oil in two hours of 150 seconds, with a slight recovery during the balance of the test. There was a total reduction of 16 seconds at the end of five hours from the body of the original oil.

In test No. 4 with the high end point gasoline, there was a drop in two hours of 142 seconds in the body of the lubricant, only a slight recovery, and a total drop at the end of five hours of 108 seconds from the original body of the oil.

The sample taken at the end of the five-hour period of each one of these tests was tested in a distillation flask and the amount of heavy end of the gasoline recovered varied from 0.5 per cent. to 1.2 per cent. All of the physical characteristics of the oil, such as gravity, flash, fire, viscosity, pour test, acidity, carbon content, showed a considerable change as indicated in chart No. 5.

The results of the above tests indicate quite clearly that dilution exists with even the most volatile fuel, but only during certain periods of the operation of the engine and under certain fixed condition. With the lightest volatile fuel, which would also be the case with the engine operating on producer, natural or furnace gas (some figures on this are given later), the tendency of the lubricating oil would be to build up in body, the same as in any other class of lubrication work where the lubricant does not come in contact with lighter hydrocarbons or lighter volatile products that can be combined with it. The above tests also indicated quite clearly that the heavier the end point of the fuel, the greater is the effect of dilution, also more permanent is its character.

In the above experiments it must be borne in mind that the aeronautic engine was operated with an exceedingly heavy lubricating oil, such as these engines require, and that carburetor and magneto adjustments were attended to by experts; that the engine was placed in perfect condition for the test and operated continuously without stopping, at high speed, for the entire five hours of the test.

The following data were secured from the examination of lubrication conditions of a considerable number of cars and trucks during December, 1919, using commercial gasoline and lubricants as purchased in the Chicago market. The cars, in some cases, were new as received from the manufacturer, and in other cases old, and old repaired.

The method of conducting the test was first to thoroughly clean the motor, then fill the crank case with the oil to be tested. Oils so used covered a range of commercial medium and heavy grades as indicated by government specifications for motor oils. The cars were then allowed to operate in their regular business for periods of ten days, during which time no particular care was given them other than ordinarily given commercial vehicles, but at the end of each two-day period an eight ounce sample would be drawn from each crank case and eight ounces of the same oil used on that particular motor would be put in with whatever additional oil was necessary. The samples were examined for dilution by measuring all the product that could be distilled from the sample of oil under 500° F. The viscocity of the sample before removal of the diluent was taken on a Saybolt Universal viscosimeter at 100° F. The method of making the ash test was to first test the oil in the Conradson carbon apparatus. After the carbon was determined a gas flame was used for burning the carbon out of the dish. The ash that remained was then weighed and percentage taken of the whole sample. This ash was made up of iron, iron oxide and silica.

Test No. 6. Three and one-half ton Diamond "T" truck. This is a new car and had never been run previous to this test. Viscosity at the end of ten days was reduced from 345 to 100 seconds. Dilution the tenth day amounted to 19 per cent. Ash 1.62 per cent.

Test No. 7. Five-ton Pierce-Arrow truck that had run 5,205 miles. On July 4, 1919, this motor was completely overhauled, new piston rings being fitted. Viscosity dropped from 358 to 90 seconds during the first six days, then recovered to 184 seconds at the end of ten days. Dilution in the case of this truck seemed to be very dependent upon weather conditions; at the end of the six-day per.od there was 20.6 per cent. of dilution, which was reduced to 8 per cent. at the end of the ten-day period.

Test No. 8. Three and one-half ton Packard truck, had run 12,551 miles. Overhauled May 5, 1919; new rings fitted. (Note:—This truck did not go out of the garage for the first two days. Engine, however, was run during this time for a period that would be equivalent to five miles' operation.) The viscosity held practically constant for the first two days when the truck was not operating in the open. After the second day there was a drop in viscosity to 43 seconds. Dilution at the end of the tenth day was 26.5 per cent.

Cause of Dilution.

With the present day fuel and the present day automotive engine, all lubricants change considerably in body within a very short operating period, this new body being the result of dilution and the dilution coming from the heavy end of the fuel.

The amount of dilution is, to a great extent, influenced by the temperature of the surrounding air, the reason being that the colder the engine and oil in the engine, the greater will be the amount of fuel it will absorb and hold. Conversely, the hotter the air or lubricating oil in the engine, the less will be the amount of fuel held in dilution, as all the fuel can be distilled off at high temperature.

In order to see if any of the dilution of a motor oil could be caused by decomposition or cracking of the oil by being thrown against hot surfaces, tests were made by the author with a commercial car operated by pure benzol. Percentages of 4 per cent. to 8 per cent. of benzol were distilled from the motor oil after 100 mile runs. The oil after the benzol had been removed possessed all of its original characteristics. Benzol can be determined as such by the chemist wherever found. These benzol tests determined satisfactorily that dilution was being caused by the fuel, though the burned odor of the oil did indicate some degree of decomposition.

The conclusions drawn from the above test with benzol are confirmed by the results of a test on a Nash six cylinder engine operated for ten hours with city gas. The original viscosity of the oil at 100° F. was 205 seconds; after ten hours' operation the viscosity had increased to 255 seconds, the flash and fire points remaining practically the same, showing that there had been no change in the oil caused by cracking and reabsorption of the lighter products, but that the absence of lighter products allowed the oil to become heavier in body.

Dilution is caused mainly by leakages past the piston rings during the compression stroke. There is a secondary leakage caused during the suction stroke, where there is a partial separation of heavy ends of the fuel from the gas entering the cylinder and absorption by the film of oil on the cylinder walls, causing some drainage on the lower exposed surfaces during the compression stroke. It is doubtful if any drainage or leakage takes place during the exhaust stroke or during the power stroke. If we assume that the losses take place during the admission and compression strokes, we are dealing with one-half of the operating period of the engine, and that will give all the opportunity necessary for the effects that have been noticed to take place.

Leakage of the gasoline or gasoline mixture is influenced by the following mechanical or operation conditions:—

(1) Piston clearance;
(2) Richness of mixture;
(3) Improper ignition;
(4) Operating temperature of motor affected by weather;
(5) Body of lubricant or thickness of film on walls of cylinders;
(6) Condition of cylinder walls;
(7) Condition of piston rings as affecting their all around fit in the grooves and against the cylinder walls;
(8) Intermittent operation;
(9) Priming and using the choker when engine is cold in starting;
(10) Choking when overloading;
(11) Character of fuel.
(12) Carburetor out of adjustment.
(13) Vacuum system out of adjustment.

Losses Caused by Dilution.

The losses are of four kinds:—
1. The loss of fuel.
2. Loss of power.
3. Wear of all parts.
4. Loss of lubricant.

Loss of Fuel.

This loss is not entirely due to the heavy end of the fuel or to the present heavy character of the fuel, as, irrespective of the nature of fuel, whether light and volatile or heavy, there will be a fuel loss during the compression stroke in a four-cycle engine. In the case of heavy end fuel this loss is reflected to a magnified extent in the dilution effect upon the lubricating oil. In the case of a very much lighter fuel, say, one of 72° Baume, the loss by the rings during the compression stroke would be just as pronounced in percentage of the amount taken into the cylinder, supposing the sealing effect of the lubricant on the piston rings to be always the same, but the effect would not be as noticeable, due to the lubricant's inability to absorb and hold the lighter fuel as a diluent at operating temperatures.

The amount of fuel lost in this manner is in no way represented by the amount of dilution found in motor oils, as there is a limited point of saturation of a motor oil dependent upon the condition under which it is operating. The losses which constantly occur are disposed of by the engine in some other way than by being entirely absorbed by the lubricant.

The loss of fuel by leakage means that all the fuel placed in the cylinder is not converted into power.

Loss of and Through the Lubricant.

The first effect of dilution is upon the viscosity or body of the lubricating oil, reducing this body to a point where it cannot be considered to be an efficient lubricant for a motor. This causes three conditions, which can be stated:

I. Loss of lubricant.
II. Loss of power.
III. Wear of the machine.

The first effect is the wastefulness of the lubricant, as the entire loss of lubricating oil in an internal combustion engine is caused by the lubricant creeping up the cylinder walls, mainly during the first cycle or admission stroke, and being later consumed in the combustion chamber. The lighter the oil is in body, the greater will be this loss. Further, there is another loss that is due to the present condition of dilution and the atttempts made to offset this, and that is by the removal of lubricating oil from the engine at periods of from 300 to 800 miles instead of the former periods of double this mileage, this mixture being thrown away.

Loss of Power

The basic rule in lubrication is illustrated best by considering the power necessary to operate a machine composed of a number of bearings. If the machine is lubricated perfectly with oil of the proper viscosity, the power will be at a minimum and speed at a maximum, and there should be practically no wear on the bearings. If, however, an oil of double or treble the viscosity is used as a lubricant, the power necessary to move the machine at the same speed will have to be materially increased due entirely to the fluid friction of the lubricant itself. Under this condition there will be practically no wear as the surfaces will be kept well apart. Attempting to lubricate the same machine with an oil that is entirely too light or thin for the work will also require the development of practically as much or even more power than in the case of the extra heavy oil, the resistance being due to metallic or solid friction, one of the results of which is, of course, abrasion with constant changing of the surfaces.

The general rule as applicable to automotive engines when considering the dilution problem is well illustrated by a test on a tractor using kerosene for fuel, where the brake horse power at the start of the test was 28 H. P., gradually dropping to 24.5 H. P. in eight hours, indicating a considerable increase in the frictional horse power. The viscosity (Saybolt) at 100° F. of the oil changed from 300" at the start to 75" at the finish of the test, at which time there was 36 per cent. of the dilution in the oil. Temperature of oil in crank case increased from 98° F. at start to 135° F. at end of run.

A lubricant actually working in a motor should have a body equal at least to that possessed by a new heavy spindle oil (130 seconds viscosity at 100° F.) and an oil of such light body must be used in a forced feed system where the pressure and constant flow of the oil will make up for its lack of thickness of lubricating film.

As a matter of fact, under present conditions of operation, most motor oils when in an engine, in the winter especially, are much lighter than a lubrication engineer would ever think of applying to the lightest piece of machinery he would be called upon to lubricate, which is a light spindle in a textile mill. A description of these spindles might allow comparisons to be made. These spindles rotate about 10,000 R. P. M., the side pull or pressure averages two pounds. The pressure on the bearing side will not be above ten pounds per square inch. The high rotation speed of the spindle tends to keep it away from the bearing surface and keep it in the center of the bolster. About one ounce of oil is placed in the base of the spindle and this amount is added to every 15 to 45 days. It has been proved by the most careful experiments that oil that has a viscosity of less than 60 seconds at 100° F., Saybolt Universal, will allow these spindles to wear perceptibly in a month's time. The oil remaining in the spindle base will become black and contain a very considerable proportion of iron and iron oxide. Further, the same spindles when lubricated with oil of from 70 to 80 seconds viscosity do not wear due to the fact that the oil is of sufficient body to keep the surfaces apart.

Therefore, the result of the lubrication of an automotive engine with a mixture of lubricating oil and heavy ends of the gasoline having a viscosity below that required for a textile spindle can only result in excessive wear, and this is shown by the ash remaining from the complete distillation of the sample of mixture taken from the motor.

Wear of Machine

The effect of poor lubrication is indicated to some extent by the readings of ash. These readings were taken on each sample and represent the total amount of ash in that particular sample. The ash is made up of oxide of iron, other metal, and of silica, the iron and other metal being from natural or unnatural wear of the engine, the oxide of iron coming from the water that has been in contact with the metal; and the silica coming from road dust, though at the time of the year this particular test was made the streets were well covered with snow and but little road dust could be expected to enter the engine through the carburetor or breather holes.

The wear of the machine is reflected in repair bills, in the necessity for reboring cylinders, refitting rings, when an engine becomes noisy and when compression is lost.

All of these features are so well known as not to need explanation. They are largely the result of wear caused by the present unbalanced condition of fuel, lubricant and engine.

Conclusion and Recommendations

As engineers we are now faced with a

* Presented at Chicago branch meeting, American Society of Mechanical Engineers, Mr. Parish being associated with the Sinclair Refining Co.

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very definite problem. It is necessary to reconsider the entire problem of the internal combustion engine on the basis of present day fuel and its effect upon the lubricant. There is but little more that the oil industry can do in regard to the fuel situation. Considerable can be done in regard to the application of motor oil; that is, the selection of motor oil for these engines upon some other basis than has generally been prevalent in the past whereby a motor of any one manufacturer was supposed to be properly suited by a certain grade of lubricant for its entire life irrespective of its physical condition. Modern lubrication engineering can, to a very considerable extent, rectify some of the damage done by this old system of selecting lubricants, basing the selection upon more scientific or practical grounds, taking into consideration all of the factors which surround the problem. The entire problem of lubricant, fuel and engine conservation can only be solved by the automotive engineer or designing mechanical engineer providing means and methods whereby the fuel will be entirely consumed on top of the pistons. Effecting compression of the air and gasoline outside of the cylinder and igniting the charge upon admission and during the power stroke would overcome practically the entire amount of fuel and air mixture leakage that takes place during the compression stroke of the present four cycle motor. Other methods will undoubtedly be proposed and worked out successfully as soon as the seriousness of the present situation is fully established.

Conservation of Lubricating Oil and Fuel

In the Air Service during the war the necessity existed for the conservation of lubricating oil, and a simple system of reclamation was designed and placed in the 30 flying fields in this country, which brought about a considerable saving in oil and money. The records show that 40 per cent. of the oil issued and used in the aeronautic engines was sent back to the reclaimers, and of that amount 73 per cent. (and as high as 95 per cent.) was reclaimed and made available for re-use, and the test records show that this reclaimed oil was if anything a better lubricant than the original new oil. The engines were cleaner after its use. Fifty per cent. of the field flying engineers stated the reclaimed oil was preferred to new oil; the other 50 per cent. said it was just as good as new oil.

Oil reclaimers are commercially successful. It is only necessary to have steam for their operation. They should be installed in every commercial garage. Reclamation of motor oil can be carried on without trouble and at a cost not exceeding ten cents a gallon. The oil so reclaimed will be just as good a lubricant as when new, but will be dark in color and have a slightly burnt odor, correction of which will require expensive and elaborate equipment and is not at all necessary.

Where reclaimers are installed oil should be removed every day. Motors should be made with larger drains and with easy methods of draining and filling. In fact it should be as easy to drain and fill a modern motor with lubricating oil as it is to fill the radiator with water or the tubes with air.

Devices to remove the dilution in the oil in the motor or in the reclaimer do not solve the main problem of economy of use of gasoline. This is squarely up to the motor manufacturer or the designing engineer. The solution must come through some entirely different mechanical use of the fuel.

Then the importance of the care of gasoline and lubricating oil must not be overlooked, and the useless wasting of even the smallest amount of gasoline or oil per car must be avoided.

We are dealing with a disappearing asset. The Bureau of Mines has sounded repeated warnings as to the reducing reserves. The oil age which we are now living in will be shortened if we do not conserve our supplies by every possible means, and conservation is squarely up to the engineers of the country, as it is necessary first to secure engines that will utilize more of the heat units of the fuel, and also designed so that mechanical losses in the use of the fuel will not occur. And it is up to the millions of car users to prevent the small losses per car which in the aggregate mean millions of gallons or even barrels of a product which is of prime necessity to modern industry.

POTASH FROM CEMENT

Now Obtained as By-Product from Illinois Shale and Valuable as Fertilizer

Potash which can be used as fertilizer can now be obtained as a by-product in the making of cement from Illinois shale, a variety of rock, according to a paper read by Professors M. M. Austin and S. W. Parr before the Fertilizer Division of the American Chemical Society in recent session at the University of Chicago.

These shales occur in at least two localities in Illinois, where they contain five or more per cent. of potash. Those which crop out in several places near Jonesboro in Union county, which would be available for the manufacture of Portland cement.

By using this material in the making of cement and then by applying the known methods of potash recovery, 5 3-10 pounds of potash, representing a value of 70 to 80 cents per barrel of cement, could be obtained. Shale from Dixon, Lee county, contains 5.8 per cent. of potash, which is held for the most part in a more stable condition than that in the Southern Illinois shale.

Recent Incorporations

National Extracts Corporation, Rochester, $20,000; T. Miceli, A. Dina, J. Daprile, Rochester.

AUTOMOBILES AND TRUCKS WASTEFUL OF GASOLINE, SAY FUEL EXPERTS

Incomplete Combustion Causes Loss of Between 20 and 30 per Cent. by Using Too Rich a Mixture

Despite the cry of high liquid fuel prices, the average owners of automobiles and operators of trucks waste a large amount of gasoline through incomplete combustion in their motor vehicles, according to the report of Dr. A. C. Fieldner and associates, read before the Fuel Symposium, Industrial Relations, at the recent meeting of the American Chemical Society in Chicago.

Dr. Fieldner is supervising chemist of the Experiment Station of the United States Bureau of Mines at Pittsburgh, Pa., and associated with him in his investigations were A. A. Straub and G. W. Jones. The discovery they have made is a by-product of another inquiry.

"The rapidly increasing use of motor vehicles in the United States," to quote from the paper, "has introduced an entirely new problem in the proper ventilation of tunnels, subways, and other confined spaces through which such machines must pass. This problem was brought to the attention of the Bureau of Mines last November by the New York and New Jersey State Bridge and Tunnel Commission, with reference to the proposed vehicular tunnel. This tunnel is 8,500 feet long between portals and presented an unprecedented problem in ventilation, both on account of its length and on account of the traffic density which is expected to reach an hourly maximum of 1,900 vehicles.

"An exhaustive study by tunnel engineers of all available data on the amount and composition of automobile exhaust gas showed that but little information was available on the percentage of carbon monoxide in that emanation from the average run of automobiles and trucks under actual operating conditions."

Dr. Fieldner explained the details of the testing, which was undertaken originally to devise a way of protecting human beings and animals from the deadly carbon monoxide, which is given off by the burning of gasoline. The generation of this noxious vapor increases where the carburetors are faulty, or are carelessly adjusted. It was considered necessary to find out how much of it would be turned loose from the average car or truck. In this way, the investigators expected to be able to calculate how much the air of the tunnel would be fouled by the long lines of moving automobiles.

The investigation was conducted under the joint auspices of the Tunnel Commissions and the Bureau of Mines for the purpose of determining the amount and composition of the exhaust gas from motor cars and trucks of various sizes when operated on roads having grades and pavements similar to those provided for in the tunnel. A number were borrowed from owners for this purpose.

"No change in carburetor adjustment was made," continued Dr. Fieldner, "as our object was to obtain information based on actual operating conditions, and not the ideal conditions of careful adjustment under which the usual tests of the automotive engineer are made.

"For this reason, surprising and, from the point of view of conservation, most disquieting results have been obtained. The average automobile owner and truck operator is wasting from 20 to 30 per cent. of his gasoline by using too rich a mixture. Preliminary tests on 70 representative cars and trucks show an average of from 6 to 8 per cent. of carbon monoxide and 7 to 9 per cent. carbon dioxide in the exhaust gas. The tendency towards rich mixtures was very much greater than towards lean mixtures. This is to be expected, as a motor will operate smoothly and accelerate rapidly with carburetor adjustment on the rich side, whereas on the lean side smooth operation does not come until the motor reaches its full operating temperature and is running at a fair speed. However, the gas excess is much greater than necessary for good operation in the great majority of the machines tested.

"Many passenger cars and trucks showed as high as 10 per cent. carbon monoxide in the exhaust. It is safe to say that 25 to 30 per cent. greater mileage could be obtained on the average of all cars tested with a little intelligent attention to the carburetor adjustment. In the aggregate this would represent an annual saving of from 25 to 30 per cent. of the gasoline employed in this country for motor vehicles, no small figure when we consider that there are now in use 7,500,000 automobiles and trucks."

CHEMISTS AS ALLIES OF PHYSICIANS MAKE FOR SUCCESS IN RESEARCH WORK

Co-operation Leads to Discovery of Substances Invaluable in Medical Practice—"Chemo-Therapy" a Leading Field of Endeavor

Chemists as allies of doctors of medicine was the theme of the address, "Chemistry's Contribution to the Life Sciences," delivered by Dr. A. S. Loevenhart, of the University of Wisconsin, before the general meeting of the American Chemical Society held in the Gold Room of the Congress Hotel recently.

Dr. Loevenhart declared that every great advance which has been made in chemistry immediately reflects itself in medicine and that it is inconceivable that any great advance can be made in chemistry without medicine being benefited thereby. As illustrative, he referred to the effect of the discovery of oxygen and the elucidation of the nature of combustion on medical thought.

In tracing out the more recent developments in biological oxidization, Dr. Loevenhart mentioned the great interest now manifested concerning organic peroxide, and indicated the need of more pure chemical work on this class of substances. Comparatively few organic peroxides have been prepared and comparatively little work has been done on the method of producing these substances. He asserted that the similarity between the oxidizing enzymes and the organic peroxide was noticeable, and that these substances are of interest also as antiseptics. The oxidizing antiseptics include the hypochlorites, and the chloramines proved to be the most useful ones during the war, and Dr. Loevenhart stated that he believed that the ideal antiseptic to be one which contains active oxygen rather than one whose oxidizing activity is due to the presence of active chlorene in the molecule. The speaker stated that certain oxidizing substances have the property of stimulating the production of antibodies, also of stimulating phagocytosis and of lessening the local inflammatory reaction. (Work of Hektoen, Arkin and Amberg.)

Dr. Loevenhart then discussed the effect of the isolation of the alkaloids in the first half of the last century on medicine. He also traced the subsequent history of the elucidation of the constitution of the alkaloids and the rise of chemotherapy. He referred very briefly to the work of Ehrlich and his co-workers and the production of arsphenamine and neoarsphenamine and referred to the work of Drs. Jacobs and Heidelberger on the chemical side and of Drs. Brown and Pearse on the biological side, at the Rockefeller Institute.

"Chemo-therapy," he continued, "constitutes one of the greatest fields of endeavor for chemistry and medicine, and for success in this field it is essential that physicians and chemists work in the closest possible harmony and co-operation."

Dr. Loevenhart asserted that the success of the research work in the chemical warfare service was due to such co-operation between chemists and physicians. As a result we know more about the biological properties of certain groups of substances used for the destruction of human life than we know about the action of substances which have been used for 2,000 years in the alleviation of human suffering. Finally, the speaker dwelt upon the importance for the advance of medicine of chemists entering the field of medicine. "It is usually impossible," he concluded, "to superimpose chemical training upon biological training, but easy to accomplish the reverse. The medical curriculum is at present so filled that we must be satisfied with the bare fundamental training in chemistry which the average medical student receives. However, for those who are going into medicine in the future with the set purpose of advancing the subject we should strongly recommend that they first receive a professional training in either physics or chemistry.

ZINC INDUSTRY IN UPPER SILESIA

Situation Regarded Satisfactory, Says German Paper—Foreign Orders Small

The Chemisch Wirischaftliche Nachrichten, of Berlin, Germany, says that employment in the Upper Silesian zinc industry is very satisfactory. Orders from abroad, however, are, taken on the whole, less important, and consumers, both inland and foreign, observe an attitude of reserve. The zinc works are likely to be occupied for a long time to come with orders given months ago. The demand for raw zinc has considerably declined, and rolled goods are also now in less demand, although the production of raw zinc has not fallen back. Business in zinc sheets, conformably with the circumstances, has also become less; but in zinc sheets, too, there is an abundance of earlier orders to be executed. The trade in zinc dust has not lately moved so easily as before, and the exportation to South America leaves at the moment something to be desired.

In respect to the production of zinc ore, there appears to be no progress; rather, it has decreased. Zinc blende, calamine, lead ore, sulphur ore, etc., have experienced a decided falling off in production compared with the period before the war. The state of the zinc industry will doubtless improve when the position becomes easier, although Upper Silesia still accounts for the larger half of Germany's zinc production. When the Eastern market is better developed the export trade should greatly increase. The price for zinc, etc., shows a tendency to decline; both the metal and the sheets have fallen in price.

FUEL SAVING SHOWS INCREASE

Scarcity of Coal Leads to Marked Conservation in Industrial Use

Fuel saving has been steadily increasing in the United States as a result of coal shortages, according to a paper read before the Fuel Symposium, Industrial Division, American Chemical Society, by Dr. Horace C. Porter, a consulting chemical engineer of Philadelphia. The expert gave convincing statistics supporting his point of view.

"During the last ten years in America," said Dr. Porter, "steel production has inceased by 60 per cent., railroad traffic has doubled, the automobile industry has multiplied itself 10 times—while our population has increased by only 15.2 per cent. In spite of the vastly increased industrialization thus shown, and of a much higher present standard of living, coal consumption per capita has remained practically stationary, and the consumption of all fuels has increased by a mere 7½ per cent.

"In other words, fuel economy has been greatly improved, there has been a considerable increase in returns from a ton of coal. The present coal shortage would be greater if this were not so, or else our industrial development would necessarily have been restricted.

"A great deal of fuel, however, is still wasted. To make fuel shortage still less a menace both now and in the future, additional fuel conservation can be practiced. Some of it is realizable with little delay, while other forms, accomplishing more, will take time and large capital outlay.

"In the first class come increased boiler furnace economy, with careful regulation of flue-gas temperatures and excess air and greater use of economizers, superheaters and feed water heaters; the application of powdered coal and gas to industrial heating furnaces as in steel and metal-working plants, and the increased use of waste heat boilers. In the second class are many major improvements whereby immense fuel saving is ultimately possible, for example, the electrification of steam railroads which if completely accomplished in this country would save 120,000,000 tons of coal per year. There is also the centralization of power development in 'super-stations' using either water power or large steam turbo-generators, by which system, to the extent of its application, at least one-third less coal would be required per unit of power sent out than in the average of the smaller stations replaced.

"Large saving in fuel, notably in oil, will ultimately come from the adoption of the heating standard for gas, and a low enough standard to permit of the highest thermal efficiency in manufacture and use. By-product coking to replace the non-recovery coking still practiced in this country would save over 8,000,000 tons of coal per year, besides valuable by-products.

"It is to be hoped that gradual extension of these fuel saving enterprises will continue to reduce our fuel consumption as related to industrial output, and that their influence in lessening the danger of fuel shortage and in lowering prices may more and more be felt."

SCIENTIFIC TIRE TESTS

A. C. S. Hears Paper on Improved Methods of Trying Automobile Tires

New light was shed at the meeting of the American Chemical Society in Chicago on methods of testing automobile tires as to their probable mileage, in an address delivered before the Rubber Section of the American Chemical Society, at the Universtiy of Chicago, by Dr. W. B. Wiegand, of Montreal, director of manufacture for a well known Canadian company (Ames Holden McCready, Ltd., of Montreal).

The quality of the tire which enables it to stand the rough usage of thousands of miles of travel, as Dr. Wiegand outlined, is due to the fact that well vulcanized rubber has several hundred times greater energy storage capacity than any other structural material. This property renders it of the greatest value in the absorption of the shocks of the main traveled road. Its energy can be changed into frictional heat, and it can also be increased by adding to it certain substances.

Keen competition has spurred rubber chemists into finding new formulae for improving materials for tire manufacture.

"In a pneumatic tire," said Dr. Wiegand, "the most important energy losses are those due to fabric chafing. For the measurement of these and also for the analysis of the casing from the standpoint of determining the effect of various physical changes upon the substance, the tire pendulum is described. It shows that the lessening of energy by the complete tread and breaker of a pneumatic tire is no greater than that caused by a single ply of carcass fabric. The tire pendulum also shows that cord fabric is three times as efficient as square woven fabric from the standpoint of energy dissipation."

Dr. Wiegand maintained that energy storage capacity was the only accurate measure of the ability of a tire to withstand the grinding wear of the highway. He told of the effect of various pigments used in the coloring of the rubber, and classified them as to active or inert, in accordance with their influence in increasing or decreasing the total energy capacity of the compounds employed.

The speaker also made brief reference to the probable special arrangement of ingredients, when added in various proportions to the elastic gum.

The Richmond Paint Co., located at 610 Main street, Cincinnati, is remodeling the front of its store. The Sherwin-Williams Co. has opened a retail establishment on the ground floor of its office building at Sixth and Main streets.

METEOR
CHEMICALS
CHEMICALS
INTERMEDIATES
DYE STUFFS
DRUGS
CHEMICALS
BICHROMATE OF SODA BICHROMATE OF POTASH SODARSS
YELLOW PRUSSIATE OF SODA YELLOW PRUSSIATE OF POTASH
ANILINE OIL ANILINE SALTS PARAPHENYLENE
BETA NAPHTHOL NAPHTHALENE BALLS & FLAKES
MALACHITE GREEN CRYSTALS METHYLENE BLUE NEUTRAL
VIOLET MAGENTA POWDER FUCHSINE CRYSTALS AURAMINE
BENZOIC ACID BENZOATE OF SODA QUININE SALTS
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IMPORTANT LESSONS TAUGHT BY COURT DECISIONS RELATIVE TO THE ENFORCEMENT OF THE FOOD AND DRUGS LAW

By Geo. L. Flanders

WHEN I received word from your secretary requesting me to discuss this subject, to wit:—Important Lessons Taught by Court Decisions Relative to the Enforcement of the Food and Drugs Law, I was not only surprised, but also embarrassed, as I had expected and hoped that this subject, or the principles that should be considered in it, was to be discussed by some one competent to do so, connected with the national administration.

But I consented, and, after doing so, thought of the old fable of the man with his load of sticks going through the woods, and as it became heavy he stopped to put on one more stick, and so on, until he had a load beyond his capacity.

However, I had understood that the discussion was to be confined to the decisions of the United States Supreme Court, and I, therefore, selected thirteen cases to discuss—an unfortunate number, but perhaps in keeping with the designation. These cases are cases which were decided by that court from the year 1888 to 1919, inclusive, and are as follows:—

Powell vs. Commonwealth of Penna., 127 U. S., 678. Decided April 9, 1888.

Leisy vs. Hardin, 135 U. S., 100. Decided April 28, 1890.

In re. Rahrer, 140 U. S., 545. Decided May 25, 1891.

Plumley vs. Commonwealth of Mass., 155 U. S., 461. Decided December 10, 1894.

Schollenberger vs. Commonwealth of Penna., 171 U. S., 1. Decided May 23, 1898.

Collins vs. New Hampshire, 171 U. S., 30. Decided May 23, 1898.

Crossman vs. Lurman, 192 U. S., 189. Decided January 11, 1904.

Hipolite Egg Co. vs. United States, 220 U. S., 45. Decided March 13, 1911.

Savage vs. Jones, 225 U. S., 501. Decided June 7, 1912.

McDermott vs. Wisconsin, 228 U. S., 115. Decided April 7, 1913.

United States vs. Coca-Cola Co., 241 U. S., 265. May 22, 1918.

Hebe Co. vs. Shaw, 248 U. S., 297. Decided January 7, 1919.

Corn Products Refg. Co. vs. Eddy, 249 U. S., 427. Decided April 14, 1919.

If I have left out in the above list any important decision by that court, I shall ask the indulgence of this body on the ground that the time given me was short and the work had necessarily to be done hurriedly in view of a steady stream of my regular work.

The case of Powell v. Commonwealth of Pennsylvania originated in the State of Pennsylvania, and was relative to oleomargarine.

The Facts

There had been several acts passed in that State relative to this commodity; the first enacted May 22, 1878, the second May 24, 1883, and the other one under which this case arose was approved May 21, 1885, and took effect July 1, 1885, and was entitled:—

"An act for the protection of the public health and to prevent adulteration of dairy products and fraud in the sale thereof."

In this case we will consider the prohibitive feature of the law only. It is contained in section 1 of the last mentioned act, and reads as follows:—

The Law

"Sec. 1. That no person, firm or corporate body shall manufacture out of any oleaginous substance or any compound of the same, other than that produced from unadulterated milk, or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream from the same, or of any imitation or adulterated butter or cheese, nor shall sell or offer for sale, or have in his, her or their possession, with intent to sell the same, as an article of food."

The Facts

The plaintiff in error was indicted in the Court of Quarter Sessions in Dauphin County, Pennsylvania. The charge in the first count of the indictment was that he unlawfully sold:—

"As an article of food, two cases, containing five pounds each, of an article designed to take the place of butter produced from pure, unadulterated milk or cream from milk, the said article so sold, as aforesaid being an article manufactured out of certain oleaginous substances and compounds of the same other than that produced from unadulterated milk or cream from milk, and said article so sold, as aforesaid, being an imitation butter.

"It was agreed for the purposes of the trial that the defendant, on July 10, 1885, in the city of Harrisburg, sold to the prosecuting witness, as an article of food, two original packages of the kind described in the first count, that such packages were sold and bought as butterine, and not as butter produced from pure, unadulterated milk or cream from unadulterated milk, and that each of said package was, at the time of sale, marked with the words 'Oleomargarine Butter' upon the lid and side in a straight line, in roman letters half an inch long. This is the case made by the Commonwealth.

"The defendant then offered to prove by Prof. Hugo Blanck that he saw manufactured the article sold to the prosecuting witness; that it was made from pure animal fats; that the process of manufacture was clean and wholesome, the article containing the same elements as dairy butter, the only difference between them being that the manufactured article contained a smaller proportion of the fatty substance known as butterine."

A verdict of guilty having been returned, the motions in arrest of judgment and for a new trial having been overruled, the defendant was adjudged to pay a fine of $100 and costs. That judgment was affirmed by the Supreme Court of the State (114 Pa. 265).

Court's Opinion.

The court said in its opinion:—

It is immaterial to inquire whether the acts with which the defendant is charged were authorized by the statute of May 22, 1878, or by that of May 24, 1883. The present prosecution is founded upon the statute of May 21, 1885; and if that statute be not in conflict with the Constitution of the United States the judgment of the Supreme Court of Pennsylvania must be affirmed.

It is contended that the last statute is void in that it deprives all coming within its provisions of rights of liberty and property without due process of law, and denies to them the equal protection of the laws; rights which are secured by the Fourteenth Amendment to the Constitution of the United States.

The court also said:—

It is scarcely necessary to say that if this statute is a legitimate exercise of the police power of the State for the protection of the health of the people, and for the prevention of fraud, it is not inconsistent with that amendment, for it is the settled doctrine of this court that, as a government is organized for the purpose, among others, of preserving the public health and the public morals, it cannot divest itself of the power to provide for those objects; and that the Fourteenth Amendment was not designed to interfere with the exercise of that power by the States. * * *

It is also contended that the act of May 21, 1885, is in conflict with the Fourteenth Amendment in that it deprives the defendant of his property without due compensation required by law. This contention is without merit, as was held in Mugler vs. Kansas. Upon the whole case we are of the opinion that there is no error in the judgment, and it is therefore affirmed.

The opinion of the court was written by Mr. Justice Harlan. There was a dissenting opinion by Mr. Justice Field, but I will not discuss this dissenting opinion or the dissenting opinion in other cases, as it would make this discussion too lengthy, and would be futile as the dissenting opinion does not settle the law.

Conclusions of Case.

The conclusions of the case are set forth in the synopsis, as follows:—

1. A statute which is a legitimate exercise of the police power of the State, for the protection of the health of the people, and for the prevention of fraud, is not inconsistent with the Fourteenth Amendment of the Constitution of the United States. That amendment was not designed to interfere with the exercise of the police power by the States.

2. Whether the manufacture of oleomargarine, or imitation butter, involves such danger to the public health as to require its entire suppression, rather than its regulation in such manner as to permit the manufacture and sale of articles of that class that do not contain noxious ingredients, is a question of fact and of public policy, which belongs to the legislative department to determine.

3. The legislative determination of such question is conclusive upon the courts, unless it appears upon the face of the statute, or from facts of which the courts must take judicial cognizance, that the statute infringes rights secured by the fundamental law.

4. Although legislation on this subject may be unwise, or unnecessarily oppressive to those manufacturing or selling wholesome oleomargarine as an article of food, yet the courts cannot interfere without usurping powers committed to another department of government; the appeal must be to the Legislature or to the ballot box, not to the judiciary.

5. The judiciary department is bound not to give effect to statutory enactments which are plainly forbidden by the Constitution; if the incompatibility of the Constitution and the statute is clear and palpable the courts must give effect to the former.

6. The Pennsylvania statute of May 21, 1885, to prevent adulteration of dairy products, etc., is not repugnant to the clause of the Fourteenth Amendment forbidding the denial by the State to any person of the equal protection of the laws, nor as depriving any person of his property without just compensation, and is valid.

Next Case Considered.

The next case to be considered is the case of Leisy Co. v. Hardin, decided April 28, 1890, and reported in 135 U. S. 100.

The opinion of the court was written by Mr. Chief Justice Fuller to which there was a dissenting opinion by Mr. Justice Gray, with whom concurred Mr. Justice Harlan and Mr. Justice Brewer.

The facts in this case were as follows:—

"Plaintiffs, Gus. Leisy & Co., are a firm of that name and style, residing in the State of Illinois, with principal place of business at Peoria, Ill.; that said firm is composed wholly of citizens of Illinois; that said firm is engaged as brewers in the manufacture of beer in the said city of Peoria, Ill., selling same in the State of Illinois and Iowa. The property in question was 152¼ barrels of beer, and 171⅛ barrels of beer, manufactured by said Leisy & Co., in the city of Peoria, Ill., and put up in said kegs and cases by the manufacturers, Gus. Leisy & Co., at Peoria, Ill.

Statement of Facts.

Mr. Justice Fuller in his statement of the facts further says:—

That each of said kegs was sealed and had placed upon it, over the plug in the opening of each keg, a United States internal revenue stamp of the district in which Peoria is situated; that said cases were made of wood, each one of them containing 24 quart bottles of beer, each bottle of beer corked and the cork fastened in with a metallic cap, sealed and covered with the foil; that said beer in all of said kegs and cases was manufactured and put up into said kegs and cases as aforesaid by the manufacturers, to wit:—Gus. Leisy & Co., plaintiffs in this suit, and to open said cases the metallic seals had to be broken.

That the property was transported by said Gus. Leisy & Co. from Peoria, Illinois, by means of railways to Keokuk, Iowa, in said sealed kegs and cases, as same was manufactured and put up by them in the city of Peoria, Illinois.

That said property was sold and offered for sale in Keokuk, Iowa, by John Leisy, a resident of Keokuk, Iowa, who is agent for said Gus. Leisy & Co. The only sales and offers to sell of said beer was in the original keg and sealed case as manufactured and put up by said Gus. Leisy & Co., and imported by them into the State of Iowa; that no kegs or cases sold or offered for sale were broken or opened on the premises; that as soon as same was purchased it was removed from the premises occupied by Gus. Leisy & Co.; that none of such sales or offers to sell were made to minors or persons in the habit of becoming intoxicated.

That on the 30th day of June, 1898, the defendant as constable by virtue of a search warrant issued by a justice of the peace upon an information charging that in premises occupied by said John Leisy there were certain intoxicating liquors, etc., seized the property therein described and took same into his custody.

And the court finds that said intoxicating liquors thus seized by the defendant in his official capacity as constable were kept for sale in the premises described in the search warrant in Keokuk, Iowa, and occupied by Gus. Leisy & Co. for the purpose of being sold, in violation of the provisions of the laws of Iowa, but which laws, the court holds, are unconstitutional and void.

That on July 2, 1898, plaintiffs filed in this court their petition, alleging, among other things, that they were the owners and entitled to the possession of said property, and that the law under which said warrant was issued was unconstitutional and void, being in violation of section 8 of article 1 of the Constitution of the United States, and, having filed a proper bond, a writ of replevin issued and the possession of said property was given to plaintiffs.

This case was then taken to the Supreme Court of the State of Iowa by appeal, and errors therein assigned as follows:—

1. The court erred in finding that the plaintiffs were the sole and unqualified owners and were entitled to the possession of the intoxicating liquors seized and held by appellant.

2. * * *

3. The court erred in holding that the sales of beer in "original packages" by the keg and case, as made by John Leisy, agent of the plaintiffs, were lawful.

4. The court erred in its conclusions and finding that so much of the law of the State of Iowa embraced in chapter 6, title XI, Code of 1873, and the amendments thereto, as prohibits such sales of beer in the State of Iowa, was unconstitutional, being in contravention of section 8, article I, of the Constitution of the United States.

5. The court erred in rendering a judgment for plaintiffs and awarding them the intoxicating liquors in question and damages and costs against defendant.

6. The court erred in overruling the defendant's action for a new trial.

Lower Court Reversed

Thus, the Supreme Court reversed the Superior Court of Iowa and entered judgment against the plaintiffs and their sureties. The above two decisions it will be seen were by the State courts of Iowa, the court of last resort of the State holding the law to be constitutional.

To review this judgment a writ of error was sued out in the Supreme Court of the United States. Mr. Chief Justice Fuller in opening his opinion in this case, said:—

The power vested in Congress "to regulate commerce with foreign nations, and among the several States and with the Indian tribes," is the power to prescribe the rule by which that commerce is to be governed, and is a power complete in itself, acknowledging no limitations other than those prescribed in the Constitution. It is co-extensive with the subject on which it acts and cannot be stopped at the external boundary of a State, but must enter its interior and must be capable of authorizing the disposition of those articles which it introduces, so that they may become mingled with the common mass of property within the territory entered.

Lengthy Opinion

The opinion is very lengthy but the conclusions are summarized in the synopsis, as follows:—

1. The citizen of one State had the right to import beer into another State and the right to sell it there in its original packages.

2. Up to such sale, the State has no power to interfere, by seizure or any other action, to prevent the importation and sale by a foreign or non-resident importer.

3. The right of transportation of an article of commerce from one State to another includes the right of the consignee to sell it in unbroken packages at the place where the transportation terminates.

4. It is only after the importation is completed and the property imported is mingled with and becomes a part of the general property of the State by a sale by the importer that State regulations can act upon it.

5. The power vested in Congress to regulate commerce among the States cannot be stopped at the external boundary of a State, but is capable of authorizing the disposition within the State of the article imported.

6. Commerce between the States has been confided exclusively to Congress by the Constitution, and is not within the jurisdiction of the police power of the State, unless placed there by Congressional action.

7. The absence of a law by Congress as to any article of commerce is equivalent to its declaration that the importation of that article into the States shall be unrestricted; and it is for the courts to determine what State action is or is not a regulation of such commerce.

8. A law of a State which forbids the receipt of an imported commodity or its sale before it has ceased to be an article of trade between one State and another is a regulation of commerce between the States, and void.

U. S. Supreme Court's Action

Thus, it will be seen that the Supreme Court of the United States reversed the decision of the Supreme Court of the State of Iowa as to the constitutionality of the law, holding that the goods taken into the State in the original packages could be sold in such packages irrespective of the State law.

This opinion was deemed a far-reaching one and established a doctrine which evidently the people did not desire to have prevail in relation to the particular commodity under consideration.

The matter was taken up in Congress and an act was passed known as the Sherman act, taking effect on August 8, 1890, which reads as follows:—

All fermented, distilled or other intoxicating liquors or liquids transported into any State or Territory or remaining therein for use, consumption, sale or storage therein for use, shall upon arrival in such State or Territory be subject to the operation and effect of the laws of such State or Territory enacted in the exercise of its police powers, to the same extent and in the same manner as though such liquids or liquors had been produced in such State or Territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise.

Constitutionality Tested

The constitutionality of this act was contested in the case of *In Re Rahrer*, reported in 140 U. S. at page 545, on the ground that the power to regulate commerce between the States had been delegated by the Constitution of the United States to the Federal Government, and in passing the above act Congress had attempted to delegate that power back to the States as to this particular product. The case was decided by the United States Supreme Court on May 25, 1891.

In the synopsis of the case, we find the following statements:—

1. The act of Congress of August 8, 1890, that intoxicating liquors transported into a State or Territory shall be subject to the laws of the State or Territory enacted in the exercise of its police powers, is constitutional and valid.

2. Intoxicating liquors transported into the State of Kansas and there sold after the passage of the act of Congress of August 8, 1890, are subject to the existing laws of the State as to the sale of such liquors.

3. The holding that the law of August 8, 1890, is applicable to a sale occurring after it took effect of liquors which arrived in Kansas prior to the passage of such law does not give such law a retrospective operation.

4. It was not necessary, after the passage of the act of Congress of August 8, 1890, to re-enact the law of Kansas of 1889, forbidding the sale of intoxicating liquors in that State, in order to make such State law operative on the sale of imported liquors.

5. Congress has power to provide that certain designated subjects of interstate commerce shall be governed by a rule which divests them of that character at an earlier time than would otherwise be the case.

6. Congress had the power to enact the law of August 8, 1890, and in doing so it has not attempted to delegate the power to regulate commerce, nor to exercise any power reserved to the States.

Rule Laid Down

By this decision, the rule laid down in Leisy v. Hardin above quoted no longer applies to liquors imported into a State.

In December, 1894, a decision was handed down by the Supreme Court of the United States in Plumley v. Commonwealth of Massachusetts, reported in 155 U. S. 461. The facts in the case were that an original package of oleomargarine colored in imitation or semblance of butter was taken into Massachusetts and sold or exposed for sale there in such package by one Benjamin A. Plumley. He was proceeded against in the courts of Massachusetts, was convicted and fined $100 and ordered locked up until it was paid.

A writ of habeas corpus was sued out and the question was raised that he was illegally confined, because the conviction was under a law which was unconstitutional, invoking the principle laid down in Leisy v. Hardin, that products imported into a State could be sold in the original packages irrespective of a State law enacted under its police powers.

The opinion in this case was written by Mr. Justice Harlan, to which there was a dissenting opinion by Mr. Justice Fuller, in which Justices Field and Brewer concurred.

Synopsis of Case

The synopsis of the case sets forth the conclusions reached in the following language:—

1. The act of Congress of August 2, 1886, on the subject of oleomargarine does not restrict the power of the States over the subject of the manufacture and sale of oleomargarine within their respective limits, nor authorize those who have paid the taxes imposed by it, to manufacture or sell oleomargarine in a State which forbids such manufacture or sale.

2. The Massachusetts statute to prevent the sale of imitation butter in its application to sales of oleomargarine brought into Massachusetts from other States is not in conflict with the clause of the United States Constitution giving Congress power to regulate commerce among the States.

3. It is within the power of a State to exclude from its markets any compound manufactured in another State which has been artificially colored or adulterated so as to cause it to look like an article of food in general use and the sale of which may, by reason of such coloration or adulteration, cheat the general public into purchasing that which they may not intend to buy.

4. A State enactment forbidding the sale of deceitful imitations of articles of food in general use among the people does not abridge any privilege secured to citizens of the United States, nor, in any just sense, interfere with the freedom of commerce among the several States.

In May, 1898, the case of Schellenberger v. Commonwealth of Pennsylvania, reported in 171 U. S. 1, was handed down by the United States Supreme Court. The facts in this case as shown by the evidence were similar to the facts in the Plumley case, except that it was not shown that the goods were colored so as to be in imitation or semblance of butter.

Opinion and Conclusions

The opinion in this case was written by Mr. Justice Peckham. There was a dissenting opinion by Mr. Justice Gray, in which Mr. Justice Harlan concurred. The conclusions reached in the opinion of the court, as briefly stated in the synopsis, are as follows:—

1. Oleomargarine having been recognized by the act of Congress of 1886 as a proper subject of taxation and of traffic and exportation and importation, and being a well-known article of food, is a proper subject of commerce among the States and with foreign nations.

2. The fact that inspection or analysis of the article imported is somewhat difficult and burdensome will not justify a State in totally excluding a pure and healthy food product.

3. A State cannot absolutely prohibit the introduction within its borders of an article of commerce which is not adulterated and which in its pure state is healthful simply because such article in the course of its manufacture may be adulterated by dishonest manufacturers for the purpose of fraud or illegal gains.

4. As Congress taxes oleomargarine and recognizes it as a proper subject of commerce it cannot be totally excluded from a State simply because the State decides that, for the purpose of preventing the importation of an impure or adulterated article, it will not permit the introduction within its borders of the pure and adulterated article.

5. A sale of a 10-pound package of oleomargarine manufactured, imported and sold by the importer under the circumstances found in the special verdict in this case was a valid

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ACETIC
NITRIC
SULPHURIC

Drums

NEW—USED
BLACK—GALVANIZED
ALL SIZES

Glycerine

CRUDE
REFINED

Vegetable Oils

COCOANUT
SOYA BEAN
PEANUT
CHINA WOOD

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POTASH SALTS
SULPHATE OF AMMONIA
ACID PHOSPHATE, ETC.

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Quicksilver

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NITRATE OF AMMONIA
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CLEVELAND, OHIO

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THE SHAWINIGAN PRODUCTS CORP.
SHAWINIGAN FALLS, QUEBEC

sale, although to a person who was a consumer.

6. An importer may sell original packages of oleomargarine by an agent as well as personally.

7. An importer has the right to sell oleomargarine in original packages to consumers as well as to wholesale dealers, and the exercise of this right will not be prevented by the fact that the packages are suitable for retail trade.

8. The Pennsylvania statute of 1885, to the extent that it prohibits the introduction of oleomargarine from another State and its sale in the original package as described in the special verdict in this case is invalid.

From the two cases last above cited, the following conclusion can be drawn:—That, as the law then stood, the State under its police powers had the right to prohibit the sale of a counterfeit or fraud even though sold in the original importer's package, but where the counterfeit or fraud did not exist, the sale in the original importer's package could not be prohibited by the State law.

Oleomargarine Act

But subsequent to the decision in this case, on May 9, 1902, Congress passed an act, known as the oleomargarine act, one section of which was in terms practically a reproduction or copy of the Sherman whiskey act, providing that oleomargarine when imported into a State should become subject to the laws of that State in the same manner and to the same extent as though produced in such State, and should not be exempt by reason of being introduced therein in original package or otherwise, so that after this date oleomargarine and whiskey when imported into a State became subject to the laws of the State immediately, irrespective of being in the original importer's package, thus making these two products an exception to the general rule laid down in Leisy v. Hardin.

Collins vs. New Hampshire

Another case of some interest is the case of Collins v. New Hampshire, reported in 171 U. S. at page 30. This was a case arising in the State of New Hampshire. That State had enacted a statute which provided as follows:—

Sec. 19. It shall be unlawful to sell, offer for sale or keep in possession with intent to sell in this State any substance or compound made wholly or in part of fats, oils, or grease not produced from milk or cream, in imitation of, or as a substitute for butter or cheese, unless the same is contained in tubs, firkins, boxes or other packages, each of which has upon it to indicate the character of its contents the words "Adulterated butter," "Oleomargarine" or "Imitation cheese," as the case may be, in plain Roman letters not less than one-half inch in length and so placed and made or attached that they can be readily seen and read and cannot be easily defaced; and if the substances or compound is a substitute for cheese, unless the cloth surrounding it has a like inscription; and if it is a substitute for butter, unless it is of a pink color. When any such substance or compound is sold in less quantities than the original packages contain, the seller shall deliver to the purchaser with it a label bearing the words indicating its character as above, in like letters.

Sec. 20. If any person shall sell, or offer for sale, or keep in possession with intent to sell, in this State any substance or compound of the kinds described in the preceding section in a manner that is made unlawful by said section, or shall sell, offer for sale or keep in possession with intent to sell, any such substance or compound without disclosing its true character, he shall be fined not more than $100 or be imprisoned not more than sixty days, or both.

The plaintiff in error, Collins, was proceeded against in the courts of New Hampshire for selling oleomargarine as the agent of Swift & Co. in violation of that part of the New Hampshire statute above quoted, on the ground that it was of a pink color when sold or exposed for sale.

Court's Opinion

The opinion of the court in this case was delivered by Mr. Justice Peckham, to which Justices Harlan and Gray dissented. The findings of the court are briefly stated in the synopsis as follows:—

1. Where the State has not the power to absolutely prohibit the sale of an article of commerce, like oleomargarine in its pure state, it has no power to provide that such article shall be colored, or, rather, discolored by adding a foreign substance to it in the manner described in the New Hampshire statute.

2. A State law which necessitates and provides for adulteration of an article of commerce and enforces upon the importer the necessity of adding a foreign substance to his article, which is thereby rendered unsalable, in order that he may be permitted lawfully to import and sell it, is an unlawful restriction of commerce.

3. In whatever language a statute may be framed its purpose must be determined by its natural and reasonable effect.

4. Although under the wording of such statute the importer is permitted to sell oleomargarine freely and to any extent, provided he colors it pink, yet the permission to sell, when accompanied by the imposition of a condition which, if complied with, will effectually prevent any sale, amounts in law to a prohibition.

5. The statute of New Hampshire making it unlawful to sell or keep in possession, with intent to sell in said State, any oleomargarine unless it is of a pink color, when applied to oleomargarine imported into that State from another State for sale, is invalid.

Draws Conclusion

From the above decision we draw the conclusion that while a State may prohibit the sale of a product that is made in imitation of another product, it cannot take the further step of making it a condition of sale of a product that it shall be so colored or adulterated before it may be sold, as to make it unsalable.

Crossman vs. Lurman

The next case to which I would call your attention is entitled Crossman vs. Lurman, handed down by the United States Supreme Court January 11, 1904, and reported in 192 U. S. 189.

The facts in the case are as follows:—In 1894 plaintiffs, who were residents of the State of New York, sold to Lurman 500 bags of coffee to be shipped from Rio Janiero to New York by the steamer Catania. When the coffee arrived certain grades were rejected by the defendant on the ground that it was not uniform in size and was colored. The Court of Appeals of New York said:—

The coffee tendered by the plaintiffs, which was rejected, was of a low grade, contained many poor, withered and black beans. It, confessedly, was colored and the beans coated with a yellowish substance. * * * It is claimed tha tthe only purpose of the coloring was to that the only purpose of the coloring was to make them appear of the same character as the good coffee.

The plaintiff thereafter sold the coffee at a reduced price and brings this action to recover the difference.

The Court of Appeals of the State of New York affirmed the decision of the court below, holding that the sale of the goods thus artificially colored for the purpose of deception was in violation of section 41 of the public health law of New York, which prohibited such sale. The case was then taken to the Supreme Court of the United States, and the opinion of the court, rendered by Mr. Justice White, sustained the decision of the New York court. In this opinion the court held held as follows:—

The prohibition against the sale within the State of adulterated food products which is made by N. Y. Laws 1893, chap. 661, section 41, does not, as applied to food products imported into the United States through the channels of foreign commerce, violate the commerce clause of the Federal Constitution, but is a valid exercise of the police power of the State to legislate for the benefit of its people in the prevention of deception and fraud.

A contract made in New York by residents thereof for the sale of residents of another State of coffee to be shipped from Rio Janeiro to New York city by a designated steamer, the buyers to have free storage and fire insurance for the first month after the arrival of the steamer, and the storage of the coffee in New York, is a New York contract, and as such is governed by the prohibition made by N. Y. Laws 1893, chapter 661, section 41, against the sale within the State of adulterated food products.

The enactment by Congress of the prohibition contained in the act of August 30, 1890, section 2, against the importation of any adulterated or unwholesome food or drug, or any liquors, adulterated or mixed with any poisonous or noxious chemical, did not have the effect of rendering inoperative as regards food products imported into the United States through the channels of foreign commerce the provision of N. Y. Laws 1893, chap. 661, section 41, prohibiting the sale within the State of adulterated food products, enacted in the exercise of the police power of the State to prevent deception and fraud.

The exclusion of evidence or a demand in some portions of the United States for artificially colored coffee, on the issue whether such coffee was adulterated within the prohibition of N. Y. Laws 1893, chap. 661, section 41, against the sale within the State of adulterated food products, will not require a reversal of the judgment of a State court on writ of error from the United States Supreme Court, on the theory that the effect of such evidence would have been to show that coffee artificially colored as a means of fraud and deception was a recognized article of commerce, the right to deal in which was protected by the commerce clause of the Federal Constitution.

Place of Contract

This case determines the question of the place of contract and that a New York State law enacted under its police powers for the prevention of fraud controlled, and that such law was not violative of the Constitution of the United States. This last question was the question involved in the Massachusetts case, in re Plumley, above discussed; i. e., as to the last question, the two decisions are in accord.

On March 13, 1911, the United States Supreme Court handed down an opinion in the case of Hipolite Egg Co. vs. United States, reported in 220 U. S. 45, Mr. Justice McKenna delivering the opinion of the court. The facts in this case were as follows:—

Fifty cans of preserved whole eggs were shipped by Thomas & Clark from St. Louis, Mo., to themselves at Peoria, Ill. When received the shipment was placed in their store room in their bakery factory. The eggs were intended for baking purposes, and were not intended for sale in the original unbroken packages or otherwise, and were not so sold. On March 11, 1909, the United States instituted libel proceedings under section 10 of the act of Congress of June 30, 1906, against these goods while they were in the store room at Peoria, Ill., where they had been received as above stated, on the ground that they were adulterated by the addition of 2 per cent of boric acid, and thereafter shipped interstate in violation of the Federal food law. The Hipolite Egg Co. appeared as claimant of the eggs. The egg company, while not contending that the shipment of the eggs was not a violation of section 2 of the act, and a misdemeanor within its terms, and not denying the power of Congress to enact it, presented three contentions, the first of which was that section 10 of the food and drugs act does not apply to an article of food which has not been shipped for sale, but which has been shipped solely for use as raw material in the manufacture of some other product; second, a United States district court has no jurisdiction to proceed in rem under section 10 against goods that have passed out of interstate commerce before the proceeding in rem was commenced; and, third, that the court had no jurisdiction to enter a personal judgment against the egg company for costs.

Defendants' Contention

In other words, the defendant contended that the remedy as provided by the statute was not coextensive with its prohibitions, and provided no adequate means for punishing the wrong when committed.

As to the first of these contentions, the court stated as follows:—

In construing the Pure Food and Drugs Act, all articles, compound or single, not intended for consumption by the producer, are regarded as designed for sale, and for that reason it is the concern of the law to have them pure. * * * The first contention of the Egg Co. is, therefore, untenable.

Thus holding that the shipping in interstate commerce of the adulterated goods was not only in violation of section 2 of the statute, but also that section 10 did apply, as the goods in question were ultimately to be sold, probably when combined or mixed with other food products, that is, after being manufactured.

As to the second contention, the court stated:—

It is clearly the purpose of the statute that they shall not be stealthily put into interstate commerce and be stealthily taken out again upon arriving at their destination and be given asylum in the mass of property of the State. Certainly not, when they are yet in the condition in which they were transported to the State, or, to use the words of the statute, while they remain "in the original, unbroken packages." In that condition they carry their own identification as contraband of law. Whether they might be pursued beyond the original package we are not called upon to say. That far the statute pursues them, and we think legally legally pursues them.

The decree of the lower court was affirmed, the court holding that:—

The object of the Pure Food and Drug Act of June 30, 1906, is to keep adulterated articles out of the channels of interstate commerce, or if they enter such commerce to condemn them while in transit, or in original or unbroken packages after reaching destination; and the provisions of section 10 of the act apply not only to articles for sale, but also to articles to be used as raw material in the manufacture of some other product.

Supreme Court Decision

On June 7, 1912, the United States Supreme Court handed down a decision in the case of Savage vs. Jones, reported in 225 U. S. at page 501.

The facts involved in this case were that plaintiff, one Marion W. Savage, a citizen of Minnesota, shipped into the State of Indiana a preparation known as "International Stock Food" which he sold at Minneapolis, to be delivered free on board of cars at Minneapolis to purchasers and consumers within the State of Indiana in the original, unbroken packages, freight being paid thereon by the consumers and purchasers. The complainant alleges that this preparation is not in any sense either concentrated commercial feeding stuff, or condimental stock feed, or a patent proprietary stock feed within the proper construction of the Indiana law, and is not advertised as possessing nutritive properties, or used except as medicine; that he does not claim that said medicinal preparation contains any crude protein or crude fat.

This action was brought to restrain the defendant, the State Chemist of Indiana, from taking proceedings to enforce an act of that State, as applied to the sales of the complainant's product, and restraining such sales in the State of Indiana.

It is alleged further that the defendant, the State Chemist of Indiana, is asserting that the complainant's manufacture is one of the concentrated commercial feeding stuffs covered by the act, and that it is the duty of the complainant to comply with its provisions with reference to its sale in Indiana,

and has stated and declared to your orator, and now threatens that unless your orator has attached in a conspicuous place on the outside of each package of your orator's said medicinal preparation offered for sale within the State of Indiana, a printed statement, clear and truthful, certifying among other things the name of the manufacturer and shipper, the place of manufacture, the place of business and chemical analysis stating the percentage of crude protein, crude fat, and crude fiber contained in said preparation and have all its constituents determined by the methods adopted by the session of official agricultural chemists, and shall also state upon said package the names of each ingredient of which said preparation is composed, he will cause the arrest and prosecution of every person dealing or trading in the medicinal preparation of your orator within the State of Indiana.

Opinion of Court

Mr. Justice Hughes delivered the opinion of the court. The opinion is very lengthy, and the synopsis is also lengthy, but, in the latter appear the following statements:—

* * * nor will the appeal be dismissed because the bill in one of its allegations asserted that complainant's product was not one of those specified in the act, if, as in this case, the bill also alleged that the proper State officer had construed the statute as applicable thereto.

In other words, that where the State law has been construed by the State courts or State authorities, that construction will seemingly be accepted by the United States Supreme Court. The synopsis contains the further holdings:—

Sales made in one State to be delivered free on board at a point therein, to be delivered to consumers in another State in the original unbroken packages, freight to be paid by purchaser, constitutes interstate commerce. * * *

Regulating the sale of food for domestic animals is properly within the scope of the State police power, and the vendors of such food are not deprived of their property without due process of law by a regulation requiring disclosure of ingredients and minimum percentage of fat and proteins, disclosure of the formula for combination not being required; and so held as to the statute of Indiana of 1907. * * *

While the State cannot, under cover of exerting the police power, directly regulate or burden interstate commerce, a police regulation which has real relation to the proper protection of the people, and is reasonable in its terms, and does not conflict with any valid act of Congress, is not unconstitutional because it may incidentally affect interstate commrece.

Where a State police statute involving inspection of goods is enforced by the affixing of stamps, it will not be held unconstitutional as a revenue measure in disguise if the bill does not allege any facts to show that the charge for stamps is unreasonable and the total sale is so much in excess of the cost of inspection as to impute bad faith.

No State statute which even affects incidentally interstate commerce is valid if it is repugnant to the Federal Food and Drugs Act, of June 30, 1906, the object of which is to prevent adulteration and misbranding and keep adulterated and misbranded articles out of interstate commerce.

Where an act of Congress relating to a subject on which the State may act also, limits its prohibitions, it leaves the subject open to State regulation as to the prohibitions which are unenumerated.

In determining whether a Federal act overrides a State law, the entire scheme must be considered and that which needs must be implied has no less force than that which is expressed.

The intent of Congress to supersede the exercise by the States of their police power will not be inferred unless the act of Congress, fairly interpreted, is in actual conflict with the law of the State.

The statute of Indiana regulating the sale, and requiring formula of ingredients of, concentrated commercial food for stock is a proper and reasonable exercise of legislative police authority for the protection of the people of the State. The act is not unconstitutional as depriving a vendor of such food who lives in another State and ships it therefrom to Indiana either as a regulation of, or burden upon, interstate commerce, as depriving any vendor thereof of his property without due process of law, or as a revenue measure beyond the power of the State, nor does the requirement for publishing the ingredients conflict in any manner with the Food and Drugs Act of 1906.

Although the Food and Drugs Act prohibits misbranding, it does not require publication of ingredients, and in that respect the field is left open for State legislation.

McDermott vs. Wisconsin

The next case to be considered is McDermott v. Wisconsin, reported in 328 U. S. 115. This case was decided April 7, 1913, and the opinion of the court was written by Mr. Justice Day. There was no dissenting opinion.

The facts in this case were that plaintiff was convicted in the Circuit Court of Dane County, Wisconsin, upon complaints made against them by an Assistant Dairy and Food Commissioner of that State for the violation of a statute of Wisconsin relating to the sale of certain articles and for the protection of the public health. The conviction was affirmed by the Supreme Court of Wisconsin in 143 Wisconsin, 18. The complaint against McDermott charged that on March 2, 1908, at Oregon in Dane County, he

did unlawfully have in his possession with intent to sell, and did offer and expose for sale and did sell, a certain article, product, compound and mixture composed of more than 75 per cent. glucose and less than 25 per cent. of cane syrup, said cane syrup being then and there mixed with said glucose, and that the can containing said compound and mixture was then and there unlawfully branded and labeled "Karo Corn Syrup" and was then and there further unlawfully branded and labeled "10 per cent. cane syrup, 90 per cent. corn syrup," contrary to the statute in such case made and provided.

It is alleged that the plaintiff had violated a section of the Wisconsin statute, L. 1907, sec. 4601, at page 646, being Chapter 567, and the pertinent parts of it are as follows:—

No person, * * * by himself * * * or agent * * * shall sell, offer or expose for sale or have in his possession with intent to sell any syrup, maple syrup, sugar-cane syrup, sugar syrup, refiners' syrup, sorghum syrup or molasses, mixed with glucose, unless the barrel, cask, keg, can, pail or other original container, containing the same be distinctly branded or labeled so as to plainly show the true name of each and all of the ingredients composing such mixture, as follows:—(the statute then sets forth the method of labeling) and provided lastly as follows:—

The mixtures or syrups designated in this section shall have no other designation or brand than herein required that represents or is the name of any article which contains a saccharine substance. * * *

Bought for Resale

The plaintiff in this case had bought for resale from wholesale grocers in Chicago and had received by rail from that city 18 gallon tin cans or pails of the articles designated in the complaint, each shipment being made in wooden boxes containing the cans, and when the goods were received, plaintiff took the cans from the boxes, and placed them on the shelves for sale at retail, and destroyed the boxes in which the goods were shipped to him, as was customary in such cases. From their nature, the articles thus canned and offered to be sold, instead of being labeled as they were, if labeled in accordance with the State law, would have been branded with the words "Glucose flavored with Refiner's Syrup," and as the statute provides that the mixtures of syrups offered for sale shall have upon them no designation or brand which represented or contained the name of a saccharine substance other than that required by the State law, the labels upon the cans must be removed, if the State authority is recognized.

Synopsis of Opinion

The synopsis of the opinion in this case reads as follows:—

State legislation in regard to labeling articles in interstate commerce which are required to be branded under the Federal Pure Food and Drugs Act, is void so far as it interferes with the provisions of such act and imposes a burden on interstate commerce; and so held, as to certain provisions of the Wisconsin statute.

Congress not only has the right to pass laws regulating legitimate commerce among the States and with foreign nations, but also has full power to bar from the channels of such commerce illicit and harmful articles.

Congress may itself determine the means appropriate to this purpose; and, so long as they do no violence to the other provisions of the Constitution, Congress is itself the judge of the means to be employed in exercising the powers conferred upon it in this respect.

The Pure Food and Drugs Act must be construed in the light of the purpose and power of Congress to exclude poisonous and adulterated food from interstate commerce. Hipolite Egg Co. v. United States, 220 U. S. 45.

Articles, the shipment or delivery of which in interstate commerce is prohibited by Section 2 of the Food and Drugs Act, are those which are adulterated or misbranded within the meaning of the act wherein adulteration and misbranding are defined.

"Package" or its equivalent, as used in Section 7 of the Food and Drugs Act, refers to the immediate container of the article which is intended for consumption by the public. To limit the requirements of the act to the outside box which is not seen by the purchasing public would render nugatory one of the principal provisions of the act.

Quaere, and not necessary to decide in this case, what is the exact meaning of the terms "original unbroken package" and "broken package," as used in Sections 2, 3 and 10 of the Food and Drugs Act.

While the enactment of Congress of the Food and Drugs Act does not prevent the State from making regulations, not in conflict therewith, to protect its people against fraud or imposition by impure food and drugs (Savage v. Jones, 225 U. S. 501), the State may not, under the guise of exercising its police power, impose burdens upon interstate commerce or enact legislation in conflict with the act of Congress on the subject.

A State law on a subject within the domain of Congress must yield to the superior power

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of Congress; to the extent that it interferes with or frustrates the operation of the act of Congress a State statute is void.

Whether articles in interstate commerce have been branded in accordance with the terms of the Food and Drugs Act is not for the State to determine, but for the Federal courts, in the manner indicated by Congress.

As the Federal Food and Drugs Act requires articles in interstate commerce to be properly labeled, a State cannot require a label when properly affixed under that statute to be removed and other labels authorized by its own statute to be affixed to the package containing the article so long as it remains unsold by the importer, whether it be in the original case or not.

The doctrine of original packages was not intended to limit the right of Congress, when it chose to assert it, as it has done in the Food and Drugs Act, to keep the channels of interstate commerce free from the carriage of injurious or fraudulently branded articles and to choose appropriate means to that end.

State legislation cannot impair legislative means provided by Congress in a Federal statute for the enforcement thereof.

The statute of Wisconsin of 1907 prescribing a label for corn syrup and prohibiting all others is invalid so far as it relates to articles properly branded on the immediate container thereof under the Federal Food and Drugs Act and brought into the State in interstate commerce, so long as they remain unsold by the importer, whether in the original outside package or not.

Conclusion Arrived At

The conclusion to be drawn from this case is that while a State may under its police power require certain brandings to be placed upon a food product, it may not say that the branding that the Federal Government requires to be upon the original package shall be removed before the goods are sold within the State.

The next case to be considered is that of the United States v. Coca Cola Co., reported in 241 U. S. 265. The decision in this case was handed down May 22, 1916, and the opinion of the court was written by Mr. Justice Hughes. Mr. Justice McReynolds took no part in the consideration or decision of this case, and there was no dissenting opinion.

Facts of Case

The facts in the case were briefly:—

This was a libel action for condemnation under the food and drugs act of a certain quantity of a food product known as "Cola Cola," transported for sale from Atlanta, Georgia, to Chattanooga, Tennessee. It was alleged that the product was adulterated and misbranded. The allegation of adulteration was, in substance, that the product contained an added poisonous or added deleterious ingredient, caffeine, which might render the product injurious to health. It was alleged to be misbranded in that the name "Cola Cola" was a representation of the presence of the substances coca and cola; that the product "contained no coca and little if any cola" and thus was an "imitation" of these substances and was offered for sale under their "distinctive name." Other charges which the government subsequently withdrew were omitted.

Defendant admitted that the product contained caffeine, but denied that it was either an added or a poisonous or deleterious ingredient which might make the product injurious, and also denied that there were substances known as coca and cola "under their own distinctive names," and it was averred that the product did contain "certain elements or substances derived from coca leaves and cola nuts." It was also set forth that "Coca Cola" was the "distinctive name" of the product, under which it had been known and sold for more than twenty years as an article of food, with other averments negativing adulteration and misbranding under the provisions of the act.

At the trial the district judge directed a verdict for the claimant, and judgment entered accordingly was affirmed on writ of error by the Circuit Court of Appeals, and the case was then taken on appeal to the Supreme Court of the United States, where this decision was rendered..

The opinion of Mr. Justice Hughes is very lengthy, but the synopsis of the opinion sets forth as follows:—

"Unde rthe Food and Drugs Act of 1906, the fact that a formula has been made up and followed and a distinctive name therefor adopted does not suffice to take an article from sec. 7, subd. 5, of the act. In such a case the standard by which the combination is to be judged is not necessarily the combination itself.

"A poisonous or deleterious ingredient with the injurious effect stated by the statute may be an added ingredient in the statutory sense although it is covered by the formula and made a constituent of the article sold.

"In construing sec. 7, subd. Fifth of the Food and Drugs Act, held, that the terms adulteration is used in a sepcial sense and its ordinary meaning is not controlling; that an article may be adulterated by the adding of an injurious ingredient including a component part of the article itself; that adulteration must not be confused with misbranding, and provisions as to latter do not limit the explicit provisions of sec. 7 of adulteration; and that proprietary foods sold under descriptive names are within its provisions, including those which were in the market when the act was passed.

"It would reduce the Food and Drugs Act to an absurdity to so construe it as to regard a compound food product, the formula of which included a poisonous or deleterious ingredient, as adulterated within the meaning of sec. 7 if such ingredient were omitted.

"Whether an added ingredient—such as caffeine—is poisonous or deleterious held, in this case, in view of competent evidence, to be a question for the jury.

"While a distinctive name may be purely arbitrary, it must be one that distinguishes the article; and where more than one name, each descriptive of an article are united, it amounts to misbranding if the article sold does not contain any of the articles generally known individually by any such names."

Distinctive Name

In the body of the opinion, the question of distinctive name is discussed more at length than in the synopsis, and the following statement appears therein:—

"Where there is a trade description of this sort by which a product of a given kind is distinctively known to the public, it matters not that the name had originally a different significance. Thus, soda-water is a familiar trade description of an article which now, as is well-known, rarely contains soda in any form. Such a name is not to be deemed either 'misleading' or 'false,' as it is in fact distinctive. * * *

"Names, however, which are merely descriptive of ingredients are not primarily distinctive names save as they appropriately describe the compound with such ingredients. To call the compound by a name descriptive of ingredients which are not present is not to give it 'its own distinctive name'—which distinguishes it from other compounds—but to give it the name of a different compound. That, in our judgment, is not protected by the proviso, unless the name has achieved a secondary significance as descriptive of a product known to be destitute of the ingredients indicated by its primary meaning."

Preservatives

The next cases we will consider will be under the heading of "preservatives." Two cases have been before the courts of the country which have attracted such attention. One is that of the Curtice Brothers Company v. Barnard, an Indiana case, and the other is that of Weigle v. Curtice Brothers Company, a Wisconsin case.

The former went to the Circuit Court of Appeals of the 7th Circuit only. The opinion was rendered October 7, 1913. This was an action by the Curtice Brothers Company against Harry E. Barnard and others. Judgment was rendered for the defendants and the plaintiff appealed.

The case shows that the appellant and another filed their sworn bill against the Food and Drug Commissioner and the members of the State Board of Health of Indiana, praying that they be restrained from enforcing their determination to prosecute criminally those who sold complainant's goods containing benzoate of soda, and from publishing statements that such sale was illegal, and from criminally prosecuting complainants, from intimidating dealers and from passing any rule forbidding the use of benzoate of soda in catsup or bulk sweet pickles.

The bill charged that the use of this article is harmless and very desirable in such manufactures as a preservative, that complainants have large sums invested in such business which will be lost if said proposed enforcement of said rule is carried out with reference to the manufacture of catsup and bulk sweet pickles.

This case, after the decision of the Circuit Court of Appeals, was taken to the Supreme Court of the United States, where it was afterwards dismissed upon stipulation without consideration by the court, as reported in 241 U. S. 636. I have been unable to find the stipulation.

Findings Set Forth

The opinion of the court in this case was rendered by Circuit Court Justice Kohlsaat, and the review of the case sets forth the following findings:—

"Whether the use of benzoate of soda as a food preservative is harmful, being still an open scientific question, the Legislature has power to prohibit its use in the exercise of its police power to preserve the public health.

"Laws Ind. 1907, c. 104, sec. 2, par. 7, provides that if prepared food contains any added substance except common table salt, saltpeter, cane sugar, vinegar, spices, etc., or other harmless preservatives whose use is authorized by the State Board of Health, it shall be deemed adulterated, and a rule adopted by the State Board of Health prohibits the use of benzoate of soda as a food preservative. Held, a proper exercise of police power, and was not a violation of the Federal or State Constitution, as depriving food manufacturers of their property without due process of law.

"Laws Ind. 1907, c. 104, sec. 2, par. 7, provides that for the purposes of the act an article shall be deemed adulterated if it contains any antiseptic or preservative substance except common table salt, saltpeter, cane sugar, vinegar, spices, or other harmless preservative the use of which is authorized by the State Board of Health, and that the board shall adopt such rules as may be necessary to enforce the act, and regulating minimum standards for food and drugs, defining specific adulteration and declaring proper methods of collecting and examining drugs and articles of food, and a violation of such rules shall be punished, etc. Held, that such act did not authorize the Board of Health to exclude the use of any preservative which it finds to be harmless, but only authorized it to distinguish between preservatives, and prohibit the use of those found to be harmful.

"Laws Ind. 1907, c. 104, sec. 2, par. 7, provides that an article of food shall be deemed adulterated if it contains any added antiseptic or preservative substance except common table salt, saltpeter, cane sugar, vinegar, spices, or other harmless preservative, the use of which is authorized by the State Board of Health. Held, that the words 'common table salt' and 'cane sugar' were used generically, and applies to and included beet sugar and rock salt.

"Laws Ind. 1907, c. 104, sec. 2, par. 7, in so far as it authorizes the State Board of Health to adopt rules to enforce the act with reference to the manufacture of foods and drugs, and to provide minimum standards, defining specific adulteration and declaring proper methods of collecting and examining foods and drugs, etc., was not unconstitutional as conferring legislative power upon the State Board of Health."

Taken to Supreme Court

As previously stated, this case was subsequently taken to the Supreme Court of the United States, but was dismissed upon stipulation without consideration by that court.

Litigation upon this question seemed to have been transferred to the State of Wisconsin, and was taken up in the case of Weigle v. Curtice Brothers Company, reported in 248 U. S. 285. This case was argued December 17, 1918, and was decided January 7, 1919. The opinion of the court was delivered by Mr. Justice Holmes. It is very short and I will therefore quote it in full, as follows:—

"This is a bill in equity brought by Curtice Brothers Company, a New York corporation, to restrain Weigle, the Dairy and Food Commissioner of Wisconsin, from enforcing certain laws of the State, especially statutes of 1913, sec. 4601g. That section makes it unlawful to sell any article of food that contains benzoic acid or benzoates, with qualifications not material here. The plaintiff makes such articles from fruit, and adds benzoate of soda as a preservative. It puts them up in glass bottles and jars properly labeled under the Food and Drugs Act (June 30, 1906, c. 3915, 34 Stat. 768), packs the bottles and jars in wooden cases containing a number of the same, and ships the cases from its factory in New York to customers in Wisconsin among others.

"Of course, the single bottles are sold in the retail trade, and their contents are served to guests in restaurants and hotels. The defendant disavowed any contention that the State laws affected or purported to affect sales by the importer in the unbroken wooden packages containing the bottles and the decree treated that subject as taken out of the case. But the bill went further and setting up a decision, incorporated in a regulation under the Food and Drugs Act, that benzoate of soda is not injurious to health and that objection would not be raised to it under the act if each container should be plainly labeled contended that under the Food and Drugs Act and the Commerce Clause of the Constitution, the Wisconsin Law was invalid even as applied to domestic retail sales of single bottles or the contents of single bottles of the plaintiff's goods. The defendant stood on a motion to dismiss and the District Court made a decree following the prayer of the bill. The defendant appealed.

"The argument in support of the decree contends in various forms that the sale of the individual bottles, when removed from the original package after entering the State, still is a part of commerce among the States, since the act of Congress as to misbranding applies to them. But the Food and Drugs Act does not change or purport to change the moment at which an object ceases to move in interstate commerce. It imposes an obligation to label the bottles severally, although contained in one original package, as of course, it may. Seven Cases of Eckman's Alterative v. United States, 239 U. S. 510, 515, 516.

"It provides for seizure and condemnation of misbranded or adulterated articles that have been transported from one State to another, although the transit is at an end, while the articles remain unsold or in original unbroken packages, as again it may. There is no reason why a lien ex delicto should be lost by the end of the journey in which the wrong was done. The two things have no relation to each other. Hipolite Egg Co. v. United States, 220 U. S. 45, 57, 58. Finally, the duty to retain the label upon the single bottles does not disappear at once. For reasons stated in McDermott v. Wisconsin, 228 U. S. 115, if the State could require the label to be removed while the bottles remained in the importer's hands unsold, it could interfere with the means reasonably adopted by Congress to make its regulations obeyed. But all this has nothing to do with the question when interstate commerce is over and the articles carried in it have come under the general power of the State. The law upon that point has undergone no change.

"The Food and Drugs Act indicates its intent to respect the recognized line of distinction between domestic and interstate commerce to clearly to need argument or an examination of its language. It naturally would, as the distinction is constitutional. The fact that a food or drug might be condemned by Congress if it passed from State to State, does not carry an immunity of foods or drugs, making the same passage, that it does not condemn. Neither the silence of Congress nor the decisions of officers of the United States have any authority beyond the domain established by the Constitution. Rast v. Deman & Lewis Co., 240 U. S. 342, 362.

"When objects of commerce get within the sphere of State legislation the State may exercise its independent judgment and prohibit what Congress did not see fit to forbid. When they get within that sphere is determined, as we have said, by the old long-established criteria. The Food and Drugs Act does not interfere with State regulation of selling at retail. Armour & Co. v. North Dakota, 240 U. S. 510; McDermott v. Wisconsin, 228 U. S. 115, 131. Such regulation is not an attempt to supplement the action of Congress in interstate commerce but the exercise of an authority outside of that commerce that always has remained in the States."

Armour & Co. vs. North Dakota

The case of Armour & Co. v. North Dakota, 240 U. S. 510, referred to in the above opinion, was decided on April 3, 1916. Mr. Justice McKenna delivered the opinion of the court, and the following findings were made as set forth in the synopsis:—

"The statute of North Dakota requiring lard when not sold in bulk to be put up in pails or other containers holding a specified number of pounds net weight or even multiples thereof and labeled as specified is not unconstitutional as denying equal protection of the law or as depriving the sellers of their property without due process of law; nor is it, as to packages sent into the State from other States and afterwards sold to consumers by retail, unconstitutional as an inerference with, or burden on, interstate commerce.

"The net weight lard statute of North Dakota is directed to the manner of selling lard at retail and is not repugnant to the Food and Drugs Act of June 30, 1908, c. 3913, 34 Stat. 768, which is directed against adulteration and misbranding of articles of food transported in interstate commerce."

Hebe Co. vs. Shaw

The next case to which I shall call your attention is entitled Hebe Company v. Shaw, and is reported in 248 U. S. at page 297. The case was decided January 7, 1919, and the opinion of the court was delivered by Mr. Justice Holmes. There was a dissenting opinion by Mr. Justice Day, with whom concurred Mr. Justice Van Devanter and Mr. Justice Brandeis.

The case originated in the State of Ohio, and the facts were:—

The plaintiff manufactured a substance or food product to be sold upon the market which he named "Hebe." The case sets forth that the product is composed of skimmed milk condensed by evaporation to which six per cent. of coconut oil is added by a process that combines the two. It is sold in tin cans containing one pound or six ounces of the product and labeled "Hebe A Compound of Evaporated Skimmed Milk and Vegetable Fat. Contains 8 per cent. Vegetable Fat, 24 per cent. Total Solids," with the place of manufacture and address of the Hebe Company.

On the side of the label are the words "For Coffee and Cereals for Baking and Cooking." By sec. 12725 of the General Code of Ohio

Whoever manufactures, sells, exchanges, exposes or offers for sale or exchange, condensed milk unless it has been made from * * * unadulterated * * * milk, from which the cream has not been removed and in which the proportion of milk solids shall be the equivalent of twelve per cent. of milk solids in crude milk, twenty-five per cent. of such solids being fat, and unless the package, can or vessel containing it is distinctly labeled, stamped or marked with its true name, brand, and by whom and under what name made,

is subject to a fine, and for each subsequent offense to a fine and imprisonment. The question was:—Does Hebe fall within these words? The court in its opinion stated:—

It seems entirely clear that condensed skimmed milk is forbidden out and out. But if so the statute cannot be avoided by adding a small amount of coconut oil. We may assume that the product is improved by the addition, but the body of it still is condensed skimmed milk, and this improvement consists merely in making the cheaper and forbidden substance more like the dearer and better one and thus at the same time more available for a fraudulent substitute. It is true that so far as the question of fraud is concerned the label on the plaintiffs' cans tells the truth—but the consumer in many cases never sees it. Moreover, when the label tells the public to use Hebe for purposes to which condensed milk is applied and states of what Hebe is made, it more than half recognizes the plain fact that Hebe is nothing but condensed milk of a cheaper sort.

The court then in its statements of fact, held,

1. That the product was within the prohibition of sec. 12725.
2. That, as so construed and applies, the statute did not violate the Fourteenth Amendment.
3. That, as applied to the cans containing the product, the prohibition of local sale was not invalid as a direct burden on interstate commerce; in this aspect the cases in which the cans were shipped, and not the cans, were the "original packages."
4. That the Federal Food and Drugs Act did not prevent such regulation.

Ohio Statute Upheld

For these reasons the statute of the State of Ohio was upheld as a legal act under the police powers of the State.

The next case to which I shall call your attention is the Corn Products Refg. Co. v. Eddy, reported in 249 U. S. 427. The opinion of the court in this case was handed down April 14, 1919, by Mr. Justice Pitney. There was no dissenting opinion. The facts in the case were as follows:—

Plaintiff is a corporation which manufactures in the State of Illinois a proprietary table syrup composed of 85 per cent. corn syrup or glucose, 10 per cent. molasses, and 5 per cent. sorghum, and sells it under the name of "Mary Jane" in cans labeled as follows:—

5 Pounds Net Weight
Mary Jane
Reg. U. S. Pat. Off.

Mary Jane is guaranteed by Corn Products Refining Co. to comply with the Food and Drugs Act, June 30, 1906. Registered under serial number 2317.

Mary Jane. A Table Syrup prepared from Corn Syrup, Molasses and Pure Country Sorghum. Contains Sulphur Dioxide.

M'f'd by Corn Products Refining Co., General Offices, New York, U. S. A.

Originated in Kansas

The case originated in the State of Kansas. Plaintiffs brought an equitable action against the members of the Board of Health in one of the district courts of Kansas, alleging that defendants were acting under the authority of the State law and certain regulations adopted by them pursuant to it, and among others Regulation 6, requiring that in the case of syrups, the principal label should state definitely the percentage of each ingredient, in the case of compounds, mixtures, imitations, or blends; and that such regulation 6 was void because in conflict with the interstate commerce clause of the Constitution of the United States and the Act of Congress of June 30, 1906, and also in conflict with the provisions of the Fourteenth Amendment; and that defendants were interfering with plaintiff's interstate commerce and with its lawful business in the State of Kansas, thereby threatening plaintiff with great and irreparable damages; and praying for an injunction.

Defendants demurred, their demurrer was overruled, they answered and the case came on for hearing with the result that the district court made a finding

that all of the allegations of plaintiff's petition are true

and adjudged that there should be a perpetual injunction restraining defendants from interfering with the sale of "Mary Jane" in the State of Kansas upon the ground that it was misbranded when sold under the label above referred to, and particularly from interfering, because of Regulation 6, with persons dealing in or selling the syrup, so branded, within the State.

Synopsis

The Supreme Court's views upon the questions in this case, as expressed in the synopsis, are as follows:—

A State regulation respecting the labeling of syrup compounds, which does not discriminate against the manufacturer or his product or against syrups as a class, held, not objectionable under the equal protection clause.

The right of a manufacturer to maintain secrecy as to his compounds and processes is subject to the right of the State, in the exercise of its police power, to require that the nature of the product be fairly set forth. Held, that a State regulation requiring manufacturers of proprietary compound syrups to state definitely in conspicuous letters on the principal label the percentage of each ingredient, is consistent with the due process clause of the Fourteenth Amendment.

It is the effect of a regulation as put in force by the State that determines whether it directly burdens interstate commerce, and not its characterization, or its construction by the State court.

The proviso in sec. 8 of the Federal Pure Food Act, that nothing in the act shall be construed as requiring proprietors or manufacturers of proprietary foods which contain no unwholesome added ingredient to disclose their trade formulas, except in so far as the provisions of the act may require to secure freedom from adulteration or misbranding, merely relates to the interpretation of the requirements of that act, and does not enlarge its purview or establish a rule as to matters which lie outside its prohibitions.

A regulation adopted by a State board of health, and in effect upheld by the State court as authorized by the State pure food law, must be regarded as State legislation in ascertaining its relation to the Federal food law.

Neither under the commerce clause directly nor through the Federal Pure Food Law, as amended, is a State forbidden to require that proprietary foods, imported into the State and sold in the original packages, shall bear labies stating the names and percentages of the ingredients composing them.

Conclusions

In the Powell case, the principle is affirmed that the legitimate exercise of the police power of a State for the pre-

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vention of fraud is not inconsistent with the 14th Amendment of the Constitution of the United States, and that whether a given product is fraudulent or involves danger to the public such as require its suppression rather than its regulation is a question of fact and public policy, to be determined by the Legislature, and that a State under its police powers could be wise or unwise or oppressive to manufacturing interests is a matter within the legislative jurisdiction, and the courts cannot interfere without usurping powers given to the legislative branch of the government.

In Leisy v. Hardin, the court held that goods being imported into the State in the original package could be sold in that package without interference from State laws.

In the Plumley case, the court held that a State under its police powers could prohibit the sale of a commodity in the original package, if it were in imitation or semblance of another product; in other words, if it were a counterfeit.

In the Schollenberger case, the same principle is laid down as was laid down in Leisy v. Hardin, as to the original package where there was no counterfeit or fraud practiced.

In re Rahrer, the court held that Congress in providing by statute that goods upon entering a State should immediately become subject to the laws of that State, irrespective of the fact that they were in the original packages, was not delegating power to the State which had been delegated to the United States, but was simply exercising that power.

In Collins v. New Hampshire, the court held that it was beyond the legislative power to provide that goods, in order to be sold, must be colored in a way that might be detrimental to the product or distasteful to the consumer, particularly where such color would be a practical prohibition of its sale.

In the Hipolite Egg case, we find that the court held that the object of the Pure Food Law is to keep adulterated goods out of the channels of interstate commerce, and that if they entered it, they could be condemned in transit or while in the original or unbroken packages after reaching their destination, even though they were not offered for sale.

In Savage v. Jones, we find the doctrine laid down that venders are not deprived of their property without due process of law by regulations requiring disclosure of ingredients and the minimum percentage of fat and protein, disclosure of the formula for combination not being required; and that a statute passed under the police power which has a proper relation to the protection of the people, is reasonable in its terms, and does not conflict with any valid act of Congress, is not unconstitutional because it may incidentally affect interstate commerce.

In McDermott v Wisconsin, the court laid down the doctrine that a State could not under its police powers provide that the markings which the Federal government required to be upon interstate goods should be removed before the goods could be sold within the State

In the Coca-Cola case, we get a discussion to some extent upon the meaning of the words "distinctive name," where it is laid down that the name may be purely arbitrary, but it must be one that distinguishes the article, and that it matters not that the name had originally a different significance, and as illustration states that soda water is a distinctive name, although the product rarely contains soda in any form.

In Curtice Bros. Co. v. Barnard, the case was not passed upon by the United States Supreme Court, but the Circuit Court of Appeals held that the laws of Indiana forbidding the use of all preservatives except those permitted by the statute and such others as should be found by the Board of Health not to be harmful, was not a violation of the Federal or State Constitutions.

In the case of Weigle v. Curtice Bros. Co., it was held that State laws forbidding sales of food articles containing benzoate of soda when sold at domestic retail sales, in the secondary packages, is not inconsistent with the commerce clause or the purpose of the Federal Food and Drugs Act, although the preservatives, as used, is allowed by the Federal act, and the containers are labeled in conformity therewith.

In Armour & Co. v. North Dakota, the decision briefly is to the effect that a State law requiring lard, when not sold in bulk, to be put up in pails or containers holding a specified number of pounds or even multiples thereof, and labeled as specified, is not unconstitutional as denying equal protection of the laws, or as depriving the sellers of their property without due process of law, nor is it unconstitutional as a burden upon interstate commerce.

In the case of Hebe Company v. Shaw, the court in brief held that the product known as Hebe was within the prohibition of sec. 12725 of the Ohio laws; that the statute did not violate the 14th Amendment to the Constitution, i. e., that it was within the police powers; that the cases in which the cans were shipped and not the cans were the original packages, and that, therefore, the law was not a burden upon interstate commerce; and, that the Ohio law was not in conflict with the Federal Food and Drugs Act.

In the Corn Products Refining Company case, a view is expressed which is of much interest to the effect that the right of a manufacturer to maintain secrecy as to his compounds and processes is subject to the right of the State, in the exercise of its police powers to require that the nature of the product be fairly set forth, and that such regulation is consistent with the due process clause of the 14th Amendment; and also, that a regulation adopted by a State board of health, and in effect upheld by the State court as authorized by the State pure food law, must be regarded as State legislation in ascertaining its relation to the Federal food law, and that such provision of a State law is not forbidden by the Federal Food and Drugs Act nor by the Constitution.

In closing I discovered that I have discussed sixteen cases instead of thirteen; i. e., I have changed from the unfortunate thirteen to sixteen to one.

PAPER SALVAGE RECEIVING ATTENTION OF COUNTRY'S LEADING CHEMISTS

Old Books and Newspapers Reclaimed by Working Process Make Excellent Print Paper

So great is the demand for paper these days that the method of removing the ink from old magazines and books was an important topic at the Cellulose Symposium, held under the auspices of the Division of Industrial and Engineering Chemistry of the American Chemical Society at the University of Chicago recently.

Dr. Charles Baskerville, Professor of Chemistry at the College of the City of New York, read a report which he had prepared jointly with Clarence M. Joyce. It was entitled "Regenerating Bookstock."

"Attention is directed," said he, "to the enormous amounts of old magazines and books, much of which now goes to waste, although much is converted into boxboard, roofing paper, etc. The term 'bookstock' is applied in the communication to used paper made primarily from chemically prepared pulp. Conservation will result in reworking more paper wastes. The differential in value of the regenerated pulp which goes back to bookstock or into boxboard must bear the cost of 'de-inking.'

"To conserve the strength and length of fiber and secure the greatest yield, the paper requires mechanical treatment whereby the fibers are loosened and drawn apart with minimum tearing; the chemical treatment should lift the ink, the substances used dissolving or emulsifying the binder and carrying the pigment particles away in the necessary washing. A combination of borax, soap, kerosene and pine oil does this best; the last mentioned being a natural solvent of rosin, used as size for many kinds of paper, and a solvent and emulsifying body for gums and resins, which are present in ground wood, used in cheaper grades of magazine papers. The process has been patented."

Dr. Baskerville and Reston Stevenson were also the authors of a paper entitled "Recovering Newsprint."

"With the prices obtaining," they said "the recovery of old newspapers in such condition as to be used again for newsprint offers an opportunity for relative conservation, if not distinct economy in fact. Methods perviously devised for recovering printed papers made little or no distinction between newsprint stock and book stock. The former normally contains a large proportion of ground wood, which yellows on treatment with caustic soda, the usual basis of chemicals applied in de-inking printed paper stock."

The authors, recognizing the difference in character of the fibers in several kinds of stocks, have studied the fundamental principles involved and devised a novel method for completely de-inking newsprint stock containing a large percentage of ground wood with the minimum production of yellowing. The process developed depends upon the addition of American fuller's earth to the alkaline solution in which the printed or soiled newspapers are pulped. The binder is loosened and the ink lifted from the fibers, the oils being absorbed by and the ink particles adhering to the argillaceous earth, which is washed away from the fiber through a fine gauze screen. Temperature factors and concentrations are given. A finished pulp, free from pigment and binder, clean as when first made, has been obtained ready made for the paper mill. If desired, the stock may be bleached by treatment with dilute sulphurous acid, but this is unnecessary for ordinary newsprint stock."

SUGAR CLARIFIED BY NEW PROCESSES MAY LEAD TO STABILIZATION OF PRICES

Use of Dorr and Williamson Clarifiers Proves Economical in Making Raw and Refined Sugar

Two new processes for clarifying sugar with less cost than at present and which are likely to be factors in stabilizing prices were described by W. D. Horne, of Yonkers, N. Y., in a paper read before the Sugar Section of the American Chemical Society in its recent session at the University of Chicago.

"In making both raw and refined sugar," said Mr. Horne, "a very essential step in the process is that of clarifying or removing the suspended and insoluble matters from the solution—in the one case raw cane juice, and in the other case the solution of raw sugar. In both cases it is customary to add milk of lime or other suitable material and heat the liquid almost to the boiling point, which causes the separation of some of the impurities in the form of flocculated precipitate. This precipitate has then to be separated from the juice or from the raw sugar solution as thoroughly as possible, and inventors have not been slow to develop various methods of effecting this end.

"Among the most ingenious and satisfactory of these methods may be mentioned the Dorr clarifier, which has recently been applied to the treatment of cane juice in Cuba, and the Williamson clarifier, which is coming into use in our refineries for the treatment of raw sugar solutions.

"The Dorr clarifier has for its object the continuous treatment of cane juice in place of the intermittent process of setting and decanting heretofore in use. It is essentially a cylindrical apparatus, 18 or 20 feet in diameter, consisting of superimposed settling compartments equipped with slowly revolving scraper mechanisms and fed through a central loading well, into which hot limed juice flows continuously. It is arranged so that the inflowing juice produces no appreciable disturbance of the liquor already in the compartments, with the result that the suspended and precipitated matters slowly settled and are removed to the central outlet in the bottom of the apparatus, while the clear juice overflows through numerous pipes at the outer walls of the compartments. This juice has been found to be very much clearer and freer from suspended impurities than that ordinarily prepared in the older type of intermittent settling and decantation tanks.

"The mud, after removal, is diluted with hot water and filter pressed, which removes from the diluted mud all of the solids in the form of a dense cake, while nearly all of the sugar is retained in the press water.

"The advantages of this process lie in the greater cleanliness of the sugars produced, the greater economy of time, labor and fuel, and the smaller loss of sugar, all of which, in the aggregate, means the saving of very large amounts of money.

"The Williamson clarifier used on the heavier solutions worked in the refinery is also a continuous acting device, but operates in the opposite manner, as this separates the impurities by flotation instead of by sedimentation. The raw sugar solution, which is about four times as dense as raw cane juice, is treated with a small amount of clarifying agents such as milk of lime, etc., and then forced through an aerating device under high air pressure to charge it with a great multitude of minute air bubbles. As this is done at a comparatively low temperature, the air bubbles do not readily separate from the viscous sugar solution. This solution is next passed into the long, shallow tank containing suitable baffles and steam pipes, where it is gradually heated nearly to the boiling point in its passage to the outlet end. This gradual heating causes the minute air bubbles to spread and rise to the surface, carrying with them all the suspended matters in the sugar liquor. This scum is very persistent and gradually moves toward the outlet end, where it is brushed away into the scum compartment, while the clarified solution is also continuously syphoned off from several inches below the surface. The clear liquor goes on the bonebiack filters for decolorization, and the scums are diluted and filter pressed. This method entirely does away with the use of bag filters and all their accompanying uncertainty, inconvenience and expense.

"Here, again, we see advantages coming from continuous operation with the accompaniment of less labor, as well as less loss of time and material."

BRITISH PATENTS RECENTLY ISSUED

ELECTROLYSIS.—W. J. Mellersh Jackson, London. British patent, 144,819, of 1919.

In the manufacture of insoluble lead compounds, such as the chromate or sulphate of white lead, the precipitant is transferred within the divided cell from the catholyte to the anolyte. A leaden anode is used. The anolyte may contain 2-3 per cent. of sodium acetate and a little sodium carbonate or lead acetate. The catholyte initially contains sodium acetate and carbonate, bicarbonate, hydrate or a mixture. During the process its alkalinity should be much greater, say 50 times, than that of the anolyte, and the anolyte should contain from about 0.1 to 0.5 per cent. of sodium carbonate and hydrate, so that precipitation takes place between the diaphragm and anode. The alkalinity is adjusted by regulating the absorption of carbonic acid, say from flue gases, by the catholyte. The gases may be purified in a scrubber containing limestone and then meet the catholyte in a tower containing coke or the like. The catholyte is circulated by a pump and pipes. Valves in the pipe and in a by-pass to the tower facilitate regulation of the circulation. By thus regulating the carbonation of the catholyte, the proportions of lead hydrate and carbonate are varied. The best product contains both large particles rich in carbonate and small particles poor in carbonate. The anolyte is circulated through a settling tank, from which the product is withdrawn. The cathode of iron, copper or the like may be contained in a frame on each side of which is a diaphragm of parchment paper, vegetable parchment or the like.

FERTILIZERS.—Badische Anilin- and Soda-Fabrik, Ludwigshafen-on-Rhine, Germany. British patent, 145,036. Convention date, July 29, 1916.

A fertilizer is obtained by mixing moist ammonium nitrate and pure or commercial potassium chloride either in equimolecular proportions or with the potassium salt in excess. Double decomposition takes place, yielding a non-deliquescent and non-explosive mixture of potassium nitrate and ammonium chloride. The mixture may be dried, and other fertilizing salts, peat, etc., may be added.

CUPRAMMONIA CELLULOSE SOLUTIONS.—Glanzfaden-Akt.-Ges., Petersdorf, Riesenge, Germany. British patent, 142,035. Convention date, October 12, 1917.

Solutions of suprammonia cellulose, which are permanent and capable of being satisfactorily spun, are obtained by the addition of sugars, both of the grape sugar group and of the cane sugar group; the former are added to prevent oxidation of the cupric salt and of the cellulose, and an amount ¼ per cent. of the cellulose taken is sufficient; the sugars of the cane sugar group and of which refined beet sugar is the most suitable, are added to effect or maintain the hydration of the cellulose, and of these sugars it is sufficient to add 2 per cent. of the weight of cellulose taken, or a little more if the cellulose has not been decomposed. By the addition of a reducing sugar it is stated that the solubility of cupric oxide in ammonia is increased, and the solution of the cellulose in such solution rendered more rapid and complete.

STORING INFLAMMABLE LIQUIDS.—P. A. P. V. Mauclere, Paris. British patent, 144,688. Convention date, February 19, 1919.

A system in which every movement of the liquid is effected by pumps and the liquid is always in contact with inert gas at atmospheric pressure comprises storage tanks and a pair of small intermediate tanks of equal capacity adapted to receive the liquid to be stored and so connected that one is emptied while the other is being filled, a battery of high-pressure inert-gas reservoirs and a pump above the highest level of the liquid in the storage tanks to pump the liquid from the intermediate tanks into the storage tanks. The liquid is fed from casks into the intermediate tanks alternately, through a pipe and a three-way cock. The liquid is delivered from the storage tanks by means of a second pump. As each tank is being filled the inert gas contained therein is forced by a compressor into the gas cylinders, which supply inert gas at atmospheric pressure to the storage tanks through an expansion valve. When the liquid is being pumped from the intermediate tanks into the storage tanks, inert gas passes from the tanks to one or other of the tanks through a pipe and a three-way cock. The operations of charging and discharging the tanks may be conducted simultaneously.

NITROGEN OXIDES.—Badische Anilin- and Soda-Fabrik, Ludwigshafen-on-Rhine, Germany. British patent, 145,095. Convention date, April 1, 1916.

The gas mixture containing ammonia and oxygen is preheated in part by the gases leaving the contact apparatus and in part by the radiant heat emitted by the contact mass, the gas mixture in the latter stage being in contact only with such materials as have no catalytic influence on it, for example china, fire-clay, magnesia or the like, and traversing a space in advance of the contact mass preferably not less than 0.5 meter in length, for example of 0.8—1.2 meters. To prevent premature reaction in the gas mixture when iron-preheaters are used, it is preferred to cool the reaction gases, which are at a temperature of 700 deg C., to a temperature not exceeding 400 deg. C., for example, by using them for steam raising; and it is also advantageous to preheat the gas mixture before passing it to the main preheater to a temperature of about 100 deg. C. in order to obviate injury to the latter when constructed of iron, and to a lesser extent of aluminum or magnalium.

AMMONIUM CHLORIDE.—Badische Anilin and Soda-Fabrik, Ludwigshafen-on-Rhine, Germany. British patent, 144,659. Convention date, July 10, 1915.

Synthetic ammonia is used in the ammonia-soda process, and the ammonium chloride liquor produced is not treated for the production of ammonia, but is evaporated to obtain a separation of sodium chloride at a high temperature, such as 100 deg. C. and then cooled to obtain a separation of ammonium chloride at a low temperature, the heating and cooling to obtain these salts being repeated if desired. The final mother-liquor, which is a cold solution saturated with ammonium and sodium chlorides, may be added to the liquor to be treated for the production of ammonium and sodium chlorides as above described. It is stated that it is advantageous to oxidize a portion of the synthetic ammonia to nitric acid and to use some of the bicarbonate of soda obtained from it to absorb the acid.

VESSELS FOR STORING LIQUIDS.—H. Frescher, Berlin. British patent, 144,700. Convention date, August 20, 1918.

A series of stoneware or other vessels are connected by siphons so that they can be simultaneously filled and discharged. The invention is stated to be particularly applicable for vessels for acids disposed on a suitable platform. In the arrangement the vessels are provided with lateral openings in their shoulders through which pass siphons. Liquid is admitted and discharged through a cock. There is a modified arrangement in which each vessel contains a single siphon tube, all of which are connected to a continuous tube. Should the siphons fail to act when discharging they can be started by applying suction at the tubular member.

PHTHALIC ANHYDRIDE.—A. Wohl, Danzig, Germany. British patent, 145,071. Convention date, June 28, 1916.

Phthalic anhydride is prepared by passing naphthalene vapour mixed with oxygen-containing gas—e. g., air—over an appropriate catalyst at a temperature below red heat, say, 380-400 deg. C.; suitable catalysts are vanadium or molybdenum oxides. The catalyst may be prepared, for example, by impregnating pumice with a colloidal solution of vanadic acid mixed with starch or finely divided blood charcoal, drying and heating in air to burn off the carbonaceous matter; or by soaking pumice in gum solution, and then shaking it with ammonium vanadate; or powdered pumice is mixed with ammonium vanadate and suitably formed; or ammonium molybdate is precipitated on pumice by means of blood charcoal, and the charcoal then burned off by heating in air.

PROTOCATECHUIC ACID AND ALDEHYDE.—L. Schmidt, Leipzig, Germany. British patent, 145,681. Convention date, September 15, 1913.

Piperonal (1 molecular part) is treated with chlorine gas (6 atomic parts) and the resulting chloride of dichlorpiperonylic acid is hydrolyzed by water to protocatechuic acid. Or piperonal is converted by phosphorus pentachloride (1 molecular part) into piperonal chloride; this is treated with chlorine gas (4 atomic parts) and the resulting dichlorpiperonal chloride is hydrolyzed by water to protocatechuic aldehyde; in the above process phosphorus pentachloride may be replaced by phosphorus (1 atomic part) and chlorine gas (5 atomic parts). The chlorination processes are preferably effected in the presence of solvents such as carbon tetrachloride, toluene, chloroform, carbon bisulphide or petroleum ether. Examples of the preparation of protocatechuic acid and protocatechuic aldehyde are given.

Preparations are being made by the Cincinnati Oil, Paint and Varnish Club for its members to attend the annual convention of the national association at St. Louis, Mo., next month. Frank Schrader, secretary of the organization, said that a committee will be appointed at a meeting of the club this week to complete arrangements for the trip. Between fifty and seventy-five manufacturers and dealers are expected to attend.

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NATURAL GAS SITUATION IN ONTARIO EXHAUSTIVELY REVIEWED IN REPORT

Provincial Government Issues Review Covering Every Phase of Industry in Province and Discussing Outlook

A report covering every phase of the natural gas situation and outlook in Ontario was issued recently by the Provincial Government of Ontario, Canada. In view of the efforts now being made to increase production to meet the great shortage and in view, further, of the serious controversy between distributors and consuming municipalities, the report has been made unusually exhaustive. It is based on evidence taken in recent months by royal commission.

The total consumption of natural gas in Ontario during the year 1919 was 11,563,304,000 cubic feet, a reduction of 1,512,000,000 cubic feet from 1918, according to the report. Of the 1919 consumption 7,891,304,000 cubic feet were taken from the Kent field and 3,672,000,000 cubic feet from the so called Eastern fields. As complete returns are not yet available, the figures for the Eastern field are approximate, but the quantities have varied so little during the past few years that they will be very close to the actual returns.

"About 15 per cent. of the population of the province have depended largely on natural gas for household cooking, heating and lighting, and unless active measures are taken to prevent waste and misuse of this commodity serious inconvenience to many hundreds of thousands will result," says the Natural Gas Commissioner, Hon. Eustace S. Estlin, in his findings as quoted in the report.

Position of Industry

The natural gas situation as it stands today is brought in the following summary of the evidence taken at recent hearings before the commission, the general trend of which indicates that:—

1. There are two recognized areas of production commonly known as the Eastern and Western gas fields, the former having been drawn upon for about thirty years and the latter for about fourteen. Some of the conditions affecting the life of the two fields differ.

2. There is a shortage of natural gas for home use in cold weather, at a time when it is most required.

3. The shortage is caused primarily by a field depletion common in the history of all gas areas, but this depletion was accelerated by excessive consumption during the war period.

4. This depletion is not being offset by development work because of prohibitive costs, and for this reason will become more acute each year.

5. Gas enterprises no longer hold out hope of financial gain under present conditions, and do not attract further capital, which is necessary for the development of new gas bearing territory.

6. If a general readjustment in the whole situation does not take place immediately the business will pass into a decline, and this valuable fuel supply will be lost to about 15 per cent. of the population of the province.

7. The need of seeking for new sources of natural gas at greater depth is apparent; this not only brings greatly increased costs, but also multiplies the risks, and the production end of the natural gas business is a miner's risk not lightly undertaken.

8. The commercial end of the enterprise is hedged in with contractual obligations assumed when the fields were young and the wells flush, and the whole situation under prevailing conditions holds out no promise of improvement.

Field Conditions

Field conditions are discussed at length. The decline of the Tilbury gas field was first indicated when gas compressor stations were first erected in 1913 and 1914. In this field the presence of salt water underlying the gas is found a great menace to the life of the field because, as the field pressures decline, the water invades and seals up the porous rock containing the gas. There was a general decline in rock pressures in the Union Natural Gas Co.'s field from 540 pounds in 1912 to 318 pounds at the present time. In 1915 the open-flow measurement of the Union wells was 90,000,000 cubic feet; in 1919 it was 33,000,000 cubic feet. Pumping outfits have to be maintained on the Tilbury wells for keeping the water down, a separate gas engine unit being required for each well. The Union Natural Gas Co. has 171 producing wells and 14 non-producers.

This is the company which at present is seeking for higher rates in the Detroit River frontier cities.

A former field with conditions somewhat similar to those of the Tilbury field was known as the Essex gas field. It supplied the city of Windsor and large quantities of gas were exported to Detroit and Toledo. The field was drawn on for about ten years and ceased suddenly, causing great inconvenience.

The evidence goes to show that the Union company's wells and those of the Glenwood and Beaver companies, situated in the same field, were given the very best attention.

In the drilling of wells in the Tilbury field the gas is encountered just above the big water, consequently pockets cannot be drilled down so as to form a gathering basin for the water at the foot of the well; this is a serious drawback because it makes constant pumping necessary. Wells are tested daily and weekly for shut-in pressures. Only three wells were frozen during the past winter in the Union field and no producing wells were shut in during the winter.

The open-flow measurements of all the wells in the Tilbury field show a decline of about one-third, according to measurements taken in 1919. There is a strong possibility of the Tilbury field being drowned out if the output is not materially reduced; water is gaining in the field as pressures are lowered, says Commissioner Estlin, adding:—"The gas is being withdrawn at about one-third of the open-flow, which is much too fast for the safety of the field.

Then the report turns to conditions in the Eastern field:—

Water conditions here are not nearly so serious and wells will produce down to a very low pressure. Tilbury is a "tank" field; one part communicates with another through the porous rock. In the Welland-Haldimand field there are wells where the rock pressures have declined from 500 pounds to 300.

Large companies look after the field conditions more systematically than small companies or individuals, therefore the larger companies obtain the better results, says the field summary.

Recent Drilling

Recent drilling shows smaller results than formerly; this is true of all the Ontario established gas fields. Early drilling in the eastern field brought wells of from 200,000 cubic feet to 500,000 cubic feet open-flow per day. The Port Colborne-Welland Gas Company drilled five wells last year and kept three of them. Deep drilling has been tried in the eastern field and twelve wells failed. One witness claims that he could double his capacity by drilling on his reserve territory in the eastern field. In Rainham and Canboro townships the rock pressure has declined from 200 pounds to 120. The Chippewa Oil and Gas Company drilled eighteen wells in the eastern field at a cost of $21,600 and had five dry holes. It does not take the full output of all the wells to supply the summer demand.

The wet wells in the Tilbury field vary as to the time required to operate pumps. In some wells the water can be removed in a few hours; in others a whole day is required. All wells are operated to full capacity in all the fields to supply the winter demand. Some wells in the Tilbury field are being pumped at considerable expense although not producing gas, as it is found that this method keeps the water off the adjacent producing wells.

In Dover township the six deep producing wells which were drilled within the last two years by the Union Natural Gas Company, and which were connected to the Sarnia pipe line, have declined in production over one-half since they were drilled in. This is a far more rapid decline than that shown by the Tilbury wells. Total gas from the Dover wells drilled by the Union company was in December, 1919, 5,961,524 cubic feet per day, and in February, 1920, 3,439,858 cubic feet per day, a reduction of about two and one-half million cubic feet.

Tilbury Field

It is estimated that the gas field in Tilbury controlled by the Union Natural Gas Company will yield 58,859,510,000 cubic feet of gas when pressures drop to fifty pounds

In the Glenwood Company's Tilbury wells the pressure is kept back to about 100 pounds to retard the flow of water into the wells. If the compressor plants were operated, the back pressure against the water would be lowered and there would be no gas. The Glenwood Company drilled nine wells in 1919, and the Beaver Company, three, in the Tilbury field. More wells drilled in the Tilbury field would deliver the gas more quickly but would not increase the supply; the pressures would decline so much faster. The Glenwood Company would not keep a new well unless it measured over 20,000 cubic feet when brought in.

Twice as many pump-men are required to tend the wells in winter as in summer in the Tilbury field. The Union Company has sixty-five pumps out of 166 wells; siphons are being replaced with power pumps as quickly as equipment can be obtained and installed. The expense in handling water in this field is increasing.

Water is being pumped from wells drilled as recently as 1918 in the Tilbury field, but the greatest amount of water is found in the older wells.

The Glenwood Natural Gas Company has spent seven years in constructing a plant for removing the sulphur content from the Tilbury gas. This plant is the only one of its kind in existence and is located in the heart of that field. Crude ammonia in 17 per cent. solution is reduced to 2 per cent. and the gas passed through this liquid The ammonia absorbs H_2S out of the gas and ammonium sulphide is the product. The difficulty is in freeing the ammonia from the sulphur. This purifier cannot be operated continuously because of constant corrosion, which necessitates repairs.

The report goes on to urge that the only practical purifying plant is the oxide system, which, however, develops troublesome water vapor.

Continuing its account of the companies' efforts, the report says:—

The Dominion Natural Gas Company operating in the eastern fields carries 55,000 acres of operated leases and 64,000 acres of unoperated leases. Some companies hold ten times as much unoperated as operated acreage.

Wells Drilled in 1919

During 1919, 93 wells were drilled in the province. Of these new wells 77 were producing and 16 non-producing. The total increase of gas made available thereby is 20,000,000 cubic feet daily, or an average for each of the producing wells drilled of some 265,000 cubic feet per day.

Although the supply was so materially augmented by the addition of these wells, the production showed a decided falling off from the previous year. This, to a great extent, is due to the gradually declining rock pressures in the fields themselves.

Small profits or serious deficits are shown by the larger companies, owing principally to the fact that the largest amounts are sold at the lowest prices.

Reviewing the financial aspects, the report says:—

The gross revenue derived from the operations of the gas fields is not sufficient to meet ordinary expenses and make reasonable returns to investors. The production and sale of natural gas could continue if companies were permitted to sell to industries in the summer when the domestic sale is at a minimum. The increased cost of drilling new wells is prohibitive.

Domestic Consumption

The average domestic consumption of gas in the province at

25 cents is 161,000 cubic feet per annum
30 cents is 143,000 cubic feet per annum
35 cents is 128,000 cubic feet per annum
40 cents is 114,000 cubic feet per annum
45 cents is 102,000 cubic feet per annum
50 cents is 92,000 cubic feet per annum
60 cents is 75,000 cubic feet per annum
75 cents is 57,000 cubic feet per annum
$1.00 is.... 39,000 cubic feet per annum

(And in the face of these conditions the towns and cities are banded together to resist any price increases!)

Thirteen years ago good returns were made in the eastern fields. One company showed that its average profits for fourteen years were three and a half per cent. One operator in the eastern field who employs no labor is just paying expenses. Another operator in the eastern field has been operating his wells for five years and has paid no dividends.

The following companies may be mentioned:—

The Petrolia Utilities Co., the distributor in the town of Petrolia, shows a surplus from June 1, 1919, to January 31, 1920, of $256.42, and has no profits to spend in maintenance.

The Windsor Gas Co., the distributor in the city of Windsor, is operating at a loss with an investment of $1,650,392.

The Chippewa Oil and Gas Co. made a profit from 1913 to 1919 out of their eastern gas field of from 3 to 4 per cent.

The Chatham Gas Co., the distributor in the city of Chatham, will lose $8,000 per annum on a turnover of about $300,000.

The Glenwood Natural Gas Co. expended $175,000 on their purifier plant in the Tilbury field.

The National Gas Co. at the end of 1919 had a deficit of $16,000, and is paying $30,000 a year rentals.

The Union Natural Gas Co. paid a dividend in 1919 of 3¼ per cent, the greater part of which was paid out of capital.

Summary of Year in Field

Turning to field developments, the year 1919 may be summarized from the report as follows:—

During the year 75 wells changed hands. With few exceptions these were scattered in location and controlled by individual owners, who were unable to operate them as economically as the larger companies who secured them. The principal transaction of this kind was the purchase by the Union Natural Gas Co. in March of the Canadian Gas Co.'s field in Tilbury, containing 43 wells. Much work has been done in putting these in the best possible condition, new pumps having been installed because of the water difficulty in 23 of them. The purchased property consists of about 2,281 acres.

The township of West Dover has been the scene of the year's most interesting drilling operations. The Union had commenced sinking many wells in the two previous years, but the best producers were brought in last year. The Petrol Oil and Gas Co. also brought in a producer in this township. Of more than twenty wells put down in the township, seven are producing.

In Tilbury the Union his 166 producing out of the 179 which it has sunk during its history; four were brought in in 1919. After spending $250,000 in trying to locate more gas in the province when abnormal conditions caused by the war created a shortage, the Union has stopped drilling operations entirely.

Shallow Drilling Abandoned

Generally speaking, shallow drilling has been almost abandoned. Deep drilling costs have increased from 100 to 120 per cent. Companies cannot get funds invested sufficient to continue exploration work. One deep well drilled in Rondeau Provincial Park, Kent county, cost $125,000 and was a dry hole.

There are large areas of gas producing formation underlying vast districts in the province of Ontario. The area held by the National Gas Co., consisting of 30,000 acres in the eastern field, admits of great development. After operating for six years ten additional wells were drilled; one of them came in with an output of 2,000,000 and another with 1,500,000 cubic feet per day. This company has only 85 wells on the 30,000 acres, and ten of these have been pulled. The territory is good for 200 wells, and the output could be trebled if funds were procurable.

There are many dry wells scattered over the eastern gas territory. Many wells are abandoned in both the eastern and western gas fields, which are not replaced by new drilling; this is a strong factor in decreased production.

Lack of efficient equipment and the unrestricted consumption of gas without charge under leasehold agreements are responsible for much waste.

Average Waste Percentage

	1918.	1919.
Sarnia	24.8	14.5
Petrolia	41.5	34.0

The derease is caused by the improvements made in the distributing plants. In January, 1919, 100 free users consumed 46,400 cubic feet, while 100 pay users in Sarnia consumed 24,000 cubic feet, a difference of nearly 100 per cent.

Commission Hearings

The hearings of the commission were participated in by 26 counsel and 102 witnesses. As the report indicates in great detail, a serious situation was disclosed. The future existence of the industry now rests with the government and people of the province. If it is to survive, the consumers will have to be more reasonable than hitherto. While the responsibility rests with the Minister of Mines, he can hardly break the ironclad contracts which so many cities, towns and villages have secured in times past, to their present great advantage, with the helpless companies.

Seldom does a great commonwealth have to publish officially such a mass of warning evidence for the benefit of stubborn municipalities as is contained in the report as so far quoted and in the following extracts:—

"That a serious and general shortage of natural gas exists throughout the gas area of Ontario is fully borne out by the testimony of many witnesses.

"The shortage through the winter of 1919-1920, just passed, was such that gas was not obtainable in the cities, even for cooking purposes, in many instances on severely cold days.

"The homes are equipped with gas-burning appliances which do not admit of successful change to coal burning. The number of domestic services is always increasing slightly.

"The best results can be obtained from the use of low-pressure gas, but the present equipment in the homes is not suitable. One ounce pressure sufficed in one Petrolia home.

"It was brought out that it is clearly in the interest of the consuming public that independent exploration work be encouraged and the profitable connection of new wells with existing pipelines facilitated.

"Some ompanies hold ten unoperated to one operated acre. But increased cost of materials and labor prevent development work. To drill a deep well costs between $20,000 and $25,000.

"The open flow of the Dominion Natural Gas Co.'s 773 wells in the eastern field declined about 90 per cent. between 1906 and 1919. This illustrates the decrease in operation profits.

Shortages Marked in 1917

"Shortages first became marked in 1917, continued in 1918, despite the mild winter and because of war industry use, and continued increasingly in 1919, despite checks on industrial use.

"Licenses to do business are held under the Natural Gas Act by 20 prospectors, 19 drillers, 50 producers, nine pipeline operators and 39 distributors.

"Of the 1,900 wells there are 81 owners, the principal companies being the Dominion, with 802; Glenwood, 73; Beaver, 25; Industrial, 32; Northern, 74; Provincial, 209; Stevensville, 68; Union, 171, and Welland, 29.

"The three principal consumers and their 1919 amounts were:—Chatham, 1,019,916,000 cubic feet; Hamilton, 1,012,292,000 cubic feet, and Windsor, 1,759,223,000 cubic feet, the last named being a decrease of 1,175,000,000 cubic feet since 1916.

"Even with the present shortage there is great complaint against the quality of the 'sulphur gas' now so largely supplied from the Tilbury field."

BY-PRODUCT OVEN LEADS BEEHIVE

Marks New Fuel Era—Waste Eliminated by Modern Coking Methods

Coal can be conserved and a cheap and valuable gas made available for factory and kitchen through the use of the by-product coke oven, on the development of which an elaborate report was made by F. W. Sperr, Jr., and E. H. Bird, of Pittsburgh, before the Fuel Symposium of the American Chemical Society at the University of Chicago.

These well known industrial chemists declared that the usage of the last two years has demonstrated that by-product ovens lead the beehive oven everywhere throughout the United States. Before the war coke was made largely in the simple beehive oven, a device of sin, which permitted the tars to run to waste and the gases to be discharged into the air through a hole in the top of the structure. The by-product oven conserves what was formerly allowed to befoul air, or land, or stream. The tarry wastes are sources of valuable dyes and chemicals and the gas can be used for heating and lighting. The chemists reported that the quality of the coke produced by the process is just as good as that obtained from the old beehive ovens. With the exception of ammonia and its compounds, the authors explained, all the primary products of the modern coke oven have much worth as fuel.

"An examination of these fuel values," continued the chemists, "will enable us to appreciate the great economy of a by-product coke oven as compared with the beehive oven, which it is displacing. The coking of a ton of high grade coal in a beehive oven requires the consumption of 11,000 cubic feet of gas, nine gallons of tar, four gallons of light oil and a hundred pounds of coke, which, in all, generate 9,388,000 British thermal units, or the equivalent of 671 pounds of coal. The by-product oven in making a ton of coke uses 4,300 cubic feet of gas, which is equal to 2,408,000 British thermal units, or equivalent to 172 pounds of coal. The beehive oven in making a ton of coke consumes 33.5 per cent. of the heating value of the coal, while the by-product oven requires only 8.6 per cent. In 1918 there were coked in the United States 48,168,719 tons of coal. If this had been coked in by-product ovens there would have been a saving of approximately 25 per cent., or 11,983,513 tons of coal."

This economy is especially welcome to the iron and steel industry, in which the bulk of the coke product is still employed for blast furnace and iron foundry.

"It has been shown," assert the authors, "that the consumption of by-product coke per ton of pig iron is from 100 to 300 pounds less than the consumption of beehive coke."

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CARBOCOAL, NEW SMOKELESS FUEL, HELPS SOLVE HEATING PROBLEMS

A new fuel which is smokeless—a kind of half coke—has been invented, according to an announcement made recently, by Dr. Harry A. Curtis, of Newark, N. J., before the Fuel Symposium of the American Chemical Society at the University of Chicago.

Carbocoal, as it is called, is a bituminous coal which has been changed into a smokeless fuel resembling anthracite. It is prepared by crushing the soft coal and carbonizing it at a relatively low temperature of 900 degrees Fahrenheit. The coal is carried out in a horizontal retort about seven feet in diameter and 20 feet long, lined with carborundum. The coal is continually stirred and moved slowly through the retort by means of paddles mounted on two heavy steel shafts running lengthwise the retort. Each retort has a capacity of about a ton an hour, the Clinchfield plant being equipped with 24 of these retorts. Carbonization of the coal in this manner yields about twice as much tar as is obtained from the ordinary smoking process, but the semi-coke obtained is quite soft and friable. It can be used directly under the boiler of a power plant or put into a gas producer, but is not in good shape to market as a general fuel for domestic and industrial use.

In the "Carbocoal Process" the soft semi-coke is ground, briquetted with pitch, and the briquets then carbonized for about six hours at 1 800 degrees Fahrenheit. The effect of this high temperature carbonization is to render the briquets hard, dense and smokeless—quite unlike any other fuel on the market. A further substantial yield of by-products is obtained during the second carbonization, so that the "Carbocoal Process" represents a very economical method of producing a smokeless fuel from bituminous coal. The high yield of oils obtained is also of great importance in view of the rapidly diminishing supplies of petroleum in the United States and the enormous growth of industries which use oil products such as gasoline, motor spirits, lubricating oils and fuel oil.

Dr. Curtis reported that the first commercial plant manufacturing the new fuel was put into operation at Clinchfield, Va., in June, 1920, with a capacity of 500 tons of coal a day from which 350 tons of the fuel are made. The process was developed by the International Coal Products Corporation of New York. After five years of experimental work at Irvington, N. J., a large scale commercial plant at Clinchfield was established as a government war project.

"The plant," said Dr. Curtis, in conclusion, "is equally desirable in peace times, for the process employed is one solution of the large problem of the more economic use of our greatest natural resource—bituminous coal."

GLYCERINE SUBSTITUTE FOR ALCOHOL IN MAKING FLAVORING EXTRACTS

Flavors can be extracted from the vanilla bean and other substances without the aid of alcohol as a solvent. This announcement of interest to the housewifely maker of cakes and the manufacturers of ice cream, in these days of prohibition, was made at the Chicago meeting of the A. C. S. by Dr. Melvin De Groote of the Mellon Institute of Industrial Research, University of Pittsburgh, before the Division of Agricultural and Food Chemistry of the American Chemical Society in session at the University of Chicago.

"Due to the enactment of the Eighteenth Amendment," said Dr. De Groote, "another problem has presented itself in connection with vanilla flavors. Alcohol is still obtainable for the preparation of flavoring extracts, but is by no means assured for the future. Furthermore, there is considerable sentiment against the use of alcohol in any foodstuff, and finally, alcohol is expensive and adds nothing of value to the flavoring extract. Chemists have been asked to find a substitute for alcohol, especially in the various vanilla flavors. Reference was previously made to the delicacy of vanilla bean extract. The extract maker is careful in the preparation of vanilla extract so that it is not heated above 120 degrees Fahrenheit, in order that the delicate aroma will not be injured. Naturally when this extract is employed in a cake batter and subjected to 350 degrees Fahrenheit, the delicacy and strength is affected. However, vanillin and coumarin mixtures seem to withstand the higher temperatures, and similarly the cold temperatures of an ice cream freeer. Thus they are important to the baker, the ice cream maker, and the confectionery maker."

Melvin De Groote developed the fact that vanillin and coumarin, the active principles of the vanilla and the tonka beans, respectively, could be extracted in glycerine solutions, so that extracts of flavors could be prepared not only equal to Federal requirements in strength, but even stronger, and without the use of grain alcohol in any manner.

"Such extracts," he said, "will withstand freezing weather and are low in cost. They can be prepared with the same equipment as is employed in the manufacture of alcoholic extracts, and are entirely acceptable from a hygienic standpoint. Glycerine extracts have been tried on large scale and household tests and have proven to be entirely satisfactory.

"This illustrates clearly that as problems develop in regard to the use of food products they immediately have the attention of the proper authorities. Eventually the solution is made public, not only as a matter of education, but also as a matter of protection to the consumer. In fact, it may be said that this instance is typical of hundreds of other similar cases, with which the general public may not be acquainted, but which is the result of scientific investigative efforts on the part of American chemists to solve our national problems, and thus promote the public welfare."

SUGAR WASTE COULD BE PREVENTED BY PROPERLY CURING RAW PRODUCT

Dr. C. A. Browne, Chairman of Section of Sugar Chemistry, American Chemical Society, Urges This in an Interesting Address

The proper curing of raw sugar in order to prevent a falling off in standard was urged recently by Dr. C. A. Browne, of New York, chairman of the Section of Sugar Chemistry of the American Chemical Society, in one of its sessions at the University of Chicago. His address, entitled "Some Characteristics of Cane Sugars," represented careful studies made by him as a consulting expert.

Dr. Browne said that the tendency in the last year had been toward the production of a 96 test sugar, the quality being determined by polarization of the effect which light has upon sugar solutions. He declared that such was the trend, that the total importations of sugar of 96 test which showed a high sweetening power had increaed from 56.2 per cent. of the total importations of 1911 to about 75 per cent. in 1916, since which time the percentage has remained uniform.

"The average polarization of sugars for each month of the year," continued Dr. Browne, "follows a regular curve, being the highest in April with an average of 96 and then falling off to October, where a minimum of 94.5 is reached. This decrease of 1.5 per cent. is due largely to deterioration of sugar in the warm summer during storage or transit. If raw sugars were cured properly the loss from deterioration could be prevented and the percentage of 96 testing sugar increased to 80 or 83 per cent.

"The various tropical countries," he continued, "produce raw cane sugars of such definite characteristics that chemical analysis, physical appearance or biological examination will in many cases establish the origin of the sugar. The raw cane sugar of British Guiana, for example, has its reducing sugar in an optically inactive form. Certain localities impart peculiarities to the composition of the ash of sugars. The various contaminating impurities in raw sugar sometimes influence the shape of crystal. These impurities may consist of gummy ingredients from fermented sugar cane, of dirt and fiber particles from imperfect clarification, or of products formed by the swarms of yeasts, bacteria, moulds and other fungi which always exist in raw cane sugar and frequently exert a destructive action upon the sucrose.

"Raw cane sugars may also at times harbor insects such as ants, beetles, etc. The sugar mite (Acarus sacchari), which has been reported of general occurrence in muscovado sugars, seems to be largely absent from modern centrifugal sugars. Shipments of raw sugar have been condemned owing to the presence of worms; in two such cases the worms were identified by the U. S. Bureau of Entomology as the larvae of Piophila casei and Dermestes Vulpinus, which had crawled into the sugar for pupation from bales of hides that were stored near by. These larvae do not feed upon sugar and their presence is purely accidental.

"During the past year of scarcity and high prices considerable unrefined plantation white sugar has been imported for direct consumption. Some of this sugar consisted of ordinary centrifugal sugar that had been washed to remove the film of adhering molasses and then shipped in an undried condition. Such sugars deteriorate very rapidly and large losses from inversion of sucrose have resulted during shipment and storage. Washed sugars when dried, either by steam or by mechanical driers, keep well. The lower grades have a polarization of about 99 and are of a dingy gray color. If suitable care is used in manufacture, plantation white sugar can be made of brilliant whiteness with a polarization of 99.8 to 99.9. The lower grades of plantation white sugar contain half a per cent. or more of mineral and organic impurities, which frequently give trouble to the candy and syrup manufacturer. In times of greater abundance, when the purchaser is less limited in choice, these lower grades of white sugars will find little demand for direct consumption, but the best grades, if care be taken always to make a clean white sugar of uniform grain, will find a considerable demand among many users."

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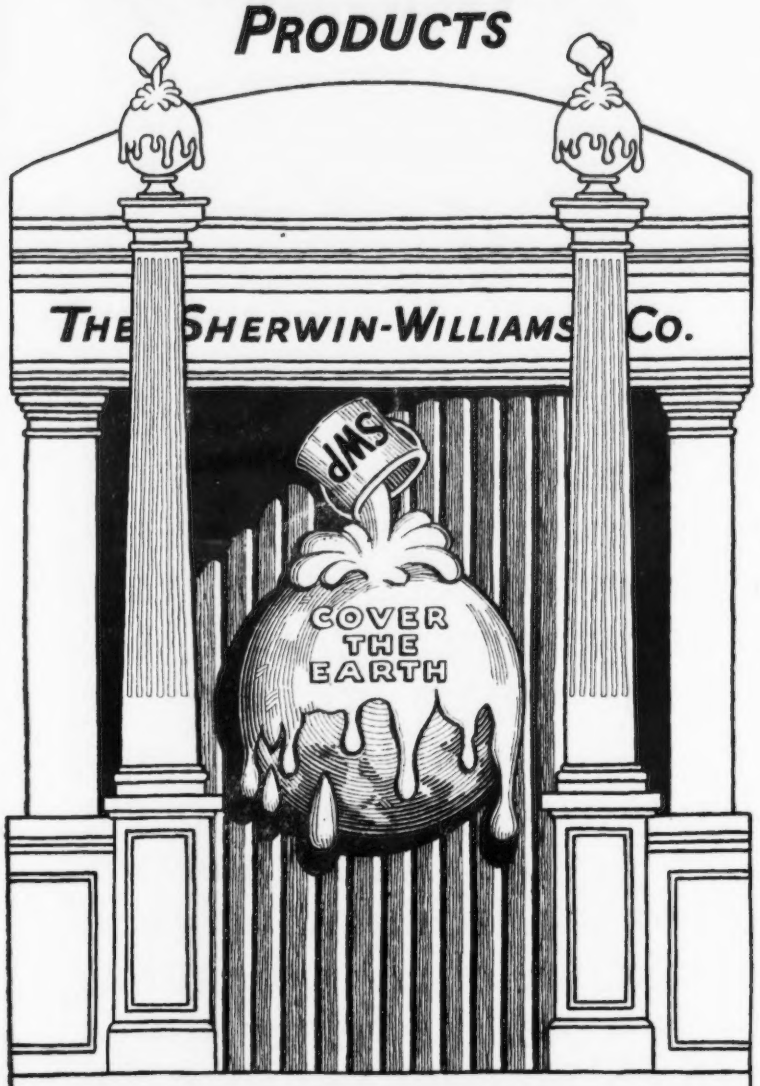

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UNITED STATES PATENTS GRANTED.

Among latest patents issued are many which have a direct interest to readers of the Oil, Paint and Drug Reporter.

Printed copies of patents may be obtained at a cost of ten cents each by addressing the Commissioner of Patents, Washington, D. C.

APPARATUS FOR CRACKING HYDROCARBONS. Patent 1,349,817.—John W. Coast, Jr., Tulsa, Okla., assignor to the Process Co., Tulsa, Okla., a corporation of Maryland. Filed September 27, 1917. Serial No. 193,471. Two claims.

2. In an apparatus for cracking petroleum hydrocarbons, a large horizontal cylindrical fire-heated cracking still wherein a body of hydrocarbon oil is confined under pressure, the arcuate bottom of said still being exposed to the fire, a series of scraper chains having their links in scraping contact with said arcuate bottom and extending approximately from one end of the still to the other, an oscillatory shaft arranged longitudinally of said still, arms depending from said shaft and secured to said chains, and operating means whereby said shaft is oscillated to drag said chains back and forth across said arcuate bottom, so as to sweep coke-forming matter from the hottest portion of the still to the relatively cool sides thereof.

HYDRCARBON FUEL BURNER. Patent 1,350,199.—Thomas E. Worthington, Kansas City, Mo. Filed November 5, 1919. Serial No. 335,914. Three claims.

1. In an oil burner comprising a concave bottom having a central, upstanding, conical projection, a baffle ring about the projection, the bottom being provided with air openings, a spider-like top fitting over the bottom and having air ports aligning with the air openings, and an oil supply pipe extending through the top of the burner.

ART OF CRACKING HYDROCARBONS. Patent 1,349,816.—John W. Coast, Jr., Tulsa, Okla., assignor to the Process Co., Tulsa, Okla., a corporation of Maryland. Filed September 27, 1917. Serial No. 193,470. One claim.

1. In the art of cracking petroleum hydrocarbons, the method which comprises confining a body of hydrocarbon oil in a large horizontal cylindrical fire-heated cracking still, the arcuate bottom of the still being exposed to the fire, maintaining the contents of said still under a pressure greater than three atmospheres, condensing the vapor passing from the still, at the same time continually scraping coke-forming matter across the fire-heated arcuate bottom, from the middle to opposite sides of the still, and permitting such coke-forming matter to accumulate in the still at relatively high elevations beyond the hottest portion of said arcuate bottom.

CRANK SHAFT FOR INTERNAL COMBUSTION ENGINES. Patent 1,349,893.—Fred S. Lee, Vanlue, Ohio. Filed March 24, 1920. Serial No. 368,338. Four claims.

1. A crank shaft comprising crank shaft journals, crank arms connected to the adjacent ends of said journals and arranged at angles to each other radially from the journals, an intermediate crank arm having segmental parts, the edges of which correspond to the angles of the first crank arms, each of said remote longitudinal edges of the first crank arms consisting of two sections, one consisting of an inset section, the other a crank arm completing section having a slot to receive the inset section, the inset section carrying one of said crank shaft journals at one end, a connecting rod journal at the other end of said inset section and being connected to an opposite segmental part of the intermediate crank arm, and means to secure the inset section in the crank arm completing section.

VAPORIZER FOR INTERNAL COMBUSTION ENGINES. Patent 1,350,079.—Thomas A. Mulkern, Hollywood, Cal., assignor of one-half to Charles E. Kerlee, Los Angeles, Cal. Filed February 24, 1919. Serial No. 278,902. One claim.

1. The combination with an internal combustion engine comprising a crank case, an exhaust manifold, and a water jacket, of a pipe nipple tapped through the wall of the exhaust manifold and having therein a cup-shaped vaporizing chamber, a bottom extending from the pipe nipple, an annular wall extending from the edge of the bottom and forming a mixing chamber in communication with the cup-shaped vaporizing chamber, a head screwed into the annular wall, a pipe connecting the mixing chamber with the intake manifold, a second pipe connecting the crank case chamber with the head and with the mixing chamber by way of a passage through the head, a third pipe connecting the water jacket with the mixing chamber by way of a passage through the head, a needle valve in the head for regulating the water passage, the lower face of the head being flat, a valve plate fitting against the flat face of the head to cover the passage through the head, a stem extending from the valve plate through the head, a spring upon the stem bearing against the head and against a seat adjustable on the stem.

FUEL BURNER. Patent 1,349,790.—James R. Smith, Mechanicsville, N. Y. Filed February 18, 1918. Serial No. 217,949. Three claims.

1. A fuel burner embodying the combination of a sealed fuel support, and an air blast feeder having means for discharging the air from points above the fuel support in a general downward direction into the fuel and onto the fuel support to cause rebounding of the air upwardly through the fuel.

APPARATUS FOR CRACKING HYDROCARBONS. Patent 1,349,815.—John W. Coast, Jr., Tulsa, Okla., assignor to the Process Co., Tulsa, Okla., a corporation of Maryland. Filed September 27, 1917. Serial No. 193,455. One claim.

1. In an apparatus for cracking petroleum hydrocarbons, a fire-heated cracking still wherein a body of hydrocarbon oil is confined, the bottom of the still being exposed to the fire, means for separating coke-forming matter from said body of oil, said means including an intake conductor arranged within the still and having an inlet near the heated lower portion of the still, a filter communicating with said intake conductor, said filter having an outlet for the discharge of filtered oil to the main body of oil, and a pump whereby oil is circulated through said intake conductor and filter, said pump and filter being arranged within the still, and pump operating means at the exterior of the still.

GAS PRODUCER ARRANGEMENT. Patent 1,350,473.—Samuel B. Sheldon, Duluth, Minn. Filed June 11, 1918. Serial No. 239,362. Four claims.

1. In a gas producer, the combination of a fuel hopper having a water jacketed floor directly above the top cover of the producer and so closely located to the top cover as to necessitate artificial cooling to prevent warping, a fuel distributor mounted adjacent to said hopper floor, a plunger for feeding fuel from the hopper onto said distributor, and means for actuating said plunger and distributor.

GAS PRODUCER. Patent 1,350,472.—Samuel B. Sheldon, Duluth, Minn. Filed June 11, 1918. Serial No. 239,361. Eight claims.

1. In a gas producer, the combination of a walking beam, and pokers mounted on opposite sides of the center thereof for disturbing the fuel in the coking zone.

GAS PRODUCER. Patent 1,350,475.—Samuel B. Sheldon, Duluth, Minn. Filed November 4, 1918. Serial No. 260,995. One claim.

1. In a gas producer, the combination of a rotary body, a stationary top therefor sealed with respect to the body to prevent the escape of gas, said top having a plurality of relatively large poker receiving openings therein, a plurality of vertically movable pokers extending loosely through said top openings to permit the pokers, when in the fuel, to lag as the body rotates, closures for said openings including ball and socket joints to permit the pokers to lag, the poker shanks being regularly vertically and reciprocally movable through the balls respectively of said joints, poker actuating mechanism, and a flexible member extending between each of said pokers and said actuating mechanism whereby the pokers are raised positively and lowered solely by gravity at regular intervals to maintain the fuel bed in a uniformly porous condition.

GAS PRODUCER. Patent 1,350,474.—Samuel B. Sheldon, Duluth, Minn. Filed September 6, 1918. Serial No. 252,862. One claim.

1. In a gas producer, the combination of a main body portion having a track thereon, a rotary top for the producer, a rotatably mounted superstructure mounted over said top and supported independently thereof, producer operating mechanism mounted on said superstructure, and propelling means mounted on said superstructure for driving said operating mechanism and for rotating said top and superstructure, the rotary top and superstructure being supported directly on said main body portion, and movably mounted on said track.

OIL BURNER. Patent 1,350,917.—William Beckman, Sealy, Texas. Filed January 2, 1920. Serial No. 354,861. Ten claims.

1. In an oil burner the combination of a casing, a flue pipe connected therewith, a cylindrical member supported in and spaced from the walls of the casing to provide a heating chamber, an adjustable damper at the top of said cylindrical member, a tubular member within the cylindrical member and spaced therefrom, to form an air heating chamber and formed near its bottom with a series of openings, a flame deflecting plate extending from the bottom of the tubular member into the heating chamber, an inclined bottom spaced from the deflecting plate to form a combustion chamber and flame passage, a drum closed at the top and disposed within and spaced from the tubular member, a conical plate within the drum having the periphery adjacent the bottom edge of the drum, a drip pan below the conical plate and an oil supply pipe extending from and connecting with the drum.

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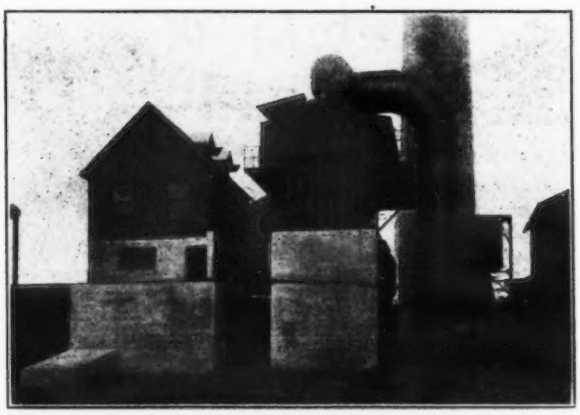

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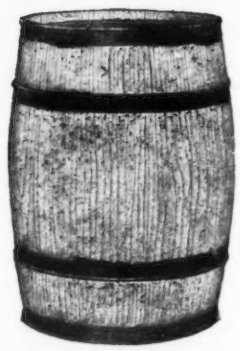

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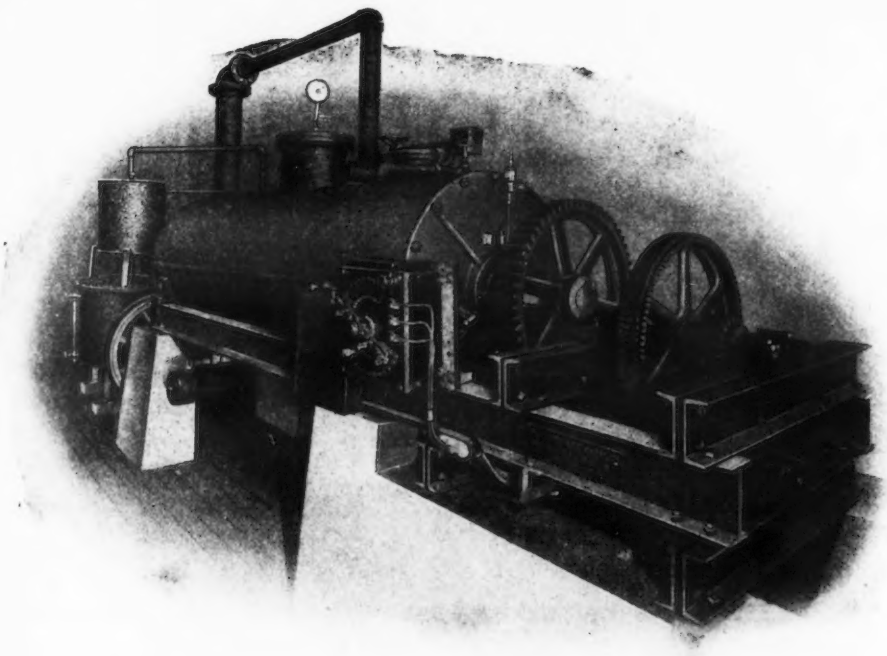

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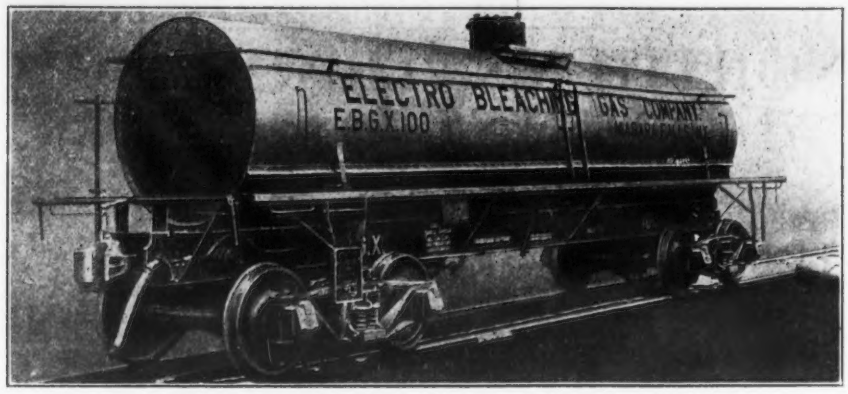

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